The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

Vol. XXIV, No. 24 CHICAGO November 19, 1921

EDITORIAL DEPARTMENT—

Nathan C. Rockwood, Editor
Chas. A. Breskin,
H. E. Hopkins,
Associate Editors

ADVERTISING STAFF—

Charles H. Fuller, Eastern Manager,
101 West 41st Street, New York City

A. S. Barnett,
Western Representative

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ROCK PRODUCTS—

Geo. P. Miller, Manager
E. M. Gibson, Assistant Manager

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N. C. Rockwood, Vice-President.
Geo. P. Miller, Treasurer.
C. O. Nelson, Secretary.

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"Better a Diagnosis Today Than a Post-Mortem Tomorrow"

"Gentlemen—For years, ever since this plant was started, we have been operating under a handicap. I'll admit we have prospered. But, of late, competition has become more aggressive—in certain instances it has been able to cut under our prices—and undoubtedly from now on is going to give us a harder tussle for business.

"I have noticed a gradual improvement in their plants—they are installing equipment that reduces manufacturing costs—everywhere the successful and progressive concerns are introducing machinery for handling their materials mechanically. And with every installation our competitors are more firmly intrenched—better able to fight us to a finish.

"Let us look the situation squarely in the face, NOW—instead of waiting for future developments—analyze our equipment and supply the remedy. Better a diagnosis today than a post-mortem tomorrow. Through greater production and elimination of waste in handling material this concern will defy competition."

Let Jeffrey Experienced Engineers prescribe the remedy for your material handling conditions—they have been doing it successfully for other concerns for more than 40 years — Jeffrey Material Handling Machinery includes Conveyers of various types, Elevators, Portable Loaders, Car Unloaders, Electric Industrial Locomotives, etc.

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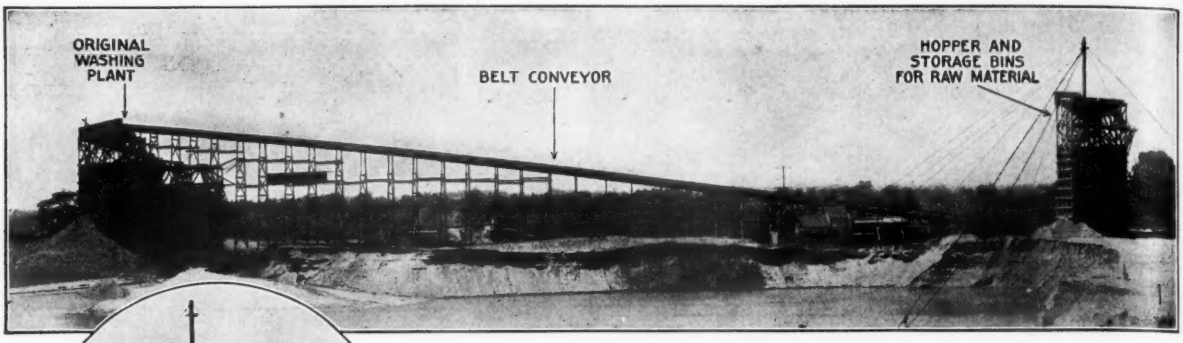

Top: The Pekin, Ill. plant of the McGrath Sand and Gravel Co., after addition of field storage bin and belt conveyor. Insert: Same plant as originally installed.

Don't Move Your Plant—Extend its area of operation

MANY sand and gravel plants using cableway excavators move their washing screens and bins after a few years of operation, because the material within reach of the cableway has been taken out.

In most cases this is wholly unnecessary, as by the simple addition of a smaller bin and belt conveyor, and the placing of the cableway in a new location, the washing plant can continue to be operated on its original location for several more years. Many times increased capacity can also be obtained by this method.

The circular insert photograph shows a plant as it was originally installed and operations first started. After a few years the material near the bins was exhausted. A new bin holding about 600 yds., was erected at a point about 600 feet away from the old structure (see top cut), and a belt conveyor installed to carry the material from this new bin to the washing screens. The new bin not only gives an extra storage of raw material, but adds to the flexibility of the plant.

The cableway may be operated with the plant shut down, or the washing plant may be operated with the cableway shut down. During the busy season, the operation may be so arranged that the raw storage bin may be empty when the day crew go off duty, then an extra night hoist operator can fill the storage bin, and when the full day crew come on duty again they can start washing immediately, and by steady running, not only keep up with the hoist men, but also wash and screen the material stored up by the night operator.

Link-Belt engineers are ready to aid in the solution of your sand and gravel handling problems. Send for book No. 440.

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SHOPE BULLETIN

VOL. I November 19, 1921 Number 6

The Proof of the Pudding

The Shope Brick Co., of Springfield, Mass., has been incorporated, with a capital of $125,000, and will manufacture concrete brick and other building material.

The officers and stockholders of the above company are practically the same as officers and stockholders of the Penn Shope Brick Co., of Reading, Pa. Here is a case where the manufacture of Shope Concrete Brick has proven such a great financial success that the organization is reaching out for new fields to conquer.

After all is said and done, the proof of the pudding is in the eating, and when an organization expands so quickly, the pudding must be filled with plums.

Garage—Shope Cream Tapestry Finish Brick Used

Hasten your inquiry—or your territory may be grabbed off

Write for complete information

Shope Brick Company

361 East Morrison Street Portland, Oregon

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Texas Shope Brick Co.—3056 Sumpter Bldg., Dallas, Tex.
Birmingham Slag Co.—Birmingham, Ala.
Shope Brick Co. of Wisconsin—50th and State Sts., Milwaukee, Wis.
Dark Canyon Stone Co., H. W. Jones, Mgr., Rapid City, S. D.
The Polychrome Cement Brick & Tile Co.—Carter-Cotton Bldg., Vancouver, B. C.
Warren Sand & Gravel Co.—Easton, Pa.
Penn Shope Brick Co.—Reading, Pa.
Lycoming Shope Brick Co.—Williamsport, Pa.
Shope Brick Co.—Portland, Ore.
Rustic Brick & Supply Co., Palette Rd., Ford City, Ont., Can.
Puyallup Shope Brick Co.—Puyallup, Wash.
Utah Shope Brick Co., P. O. Box 632, Salt Lake City, Utah
Decoration Brick Co.—1565 N. Lake Ave., Seattle, Wash.

These licensees are all successful manufacturers

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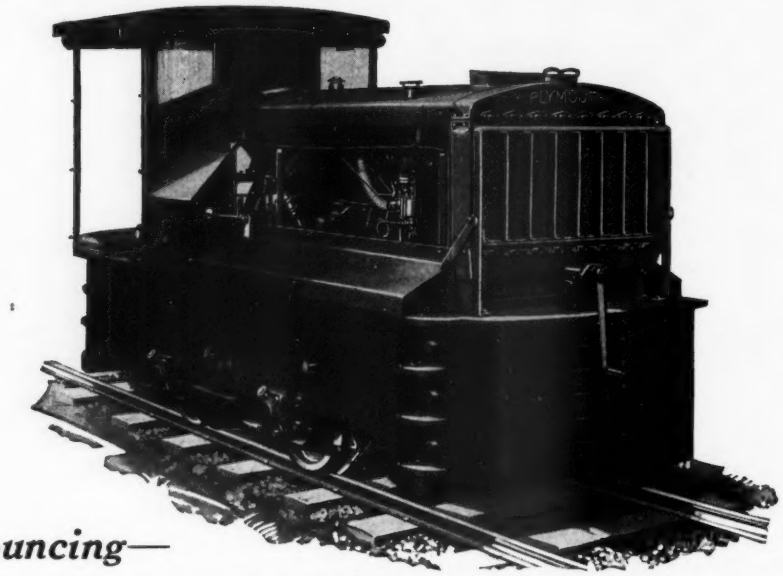

Announcing—

New PLYMOUTH Gasoline Locomotive

Model CL, 3 1-2-ton

We offer to the material handling public our Model CL PLYMOUTH Locomotive as the result of our accumulated years of experience, both in shop and actual service. It has always been our policy to keep step with industrial requirements and in this new design we submit for your consideration the important and superior features as detailed below:

Buda Engine—rugged, powerful, heavy duty, with large crankshaft, large bearings, removable cylinder head, heated intake manifold and full force feed oiling.

Extra large Radiator with Modine sectional core allowing removal of section if injured without interfering with operation. Cooled by powerful 4-blade fan.

Improved telescopic Coupling with shock absorbing provision between engine and transmission.

Drive or Disc Shaft carried in two bearings, relieving engine from all strains or stresses, resulting from one bearing shaft.

Double width Chain on main drive affords large margin of strength.

Positive and direct flow of sand thru steep angle pipes, with valve for each wheel acting as agitator also.

Heavy, rigid, re-inforced Frame, with low hanging bumpers, affording protection to sprockets and chains, also against wheels sinking between ties in case of derailment.

Greatest Accessibility and Simplicity throughout.

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THE FATE-ROOT-HEATH CO., - Plymouth, Ohio

PLYMOUTH

Gasoline Locomotives

Rock Products

Vol. XXIV Chicago, November 19, 1921 No. 24

Oklahoma Sand-Gravel Plant

The Continental Asphalt and Petroleum Company, Dougherty, Oklahoma, Has Erected Permanent Type Plant—Details of Varied Operations

THAT the sand and gravel business is establishing itself on a permanent basis is well evidenced by the fact that the new plants being built today are mostly of the reinforced concrete type. The day when anybody could go and stick up any sort of a plant near what might seem to be a good gravel deposit is rapidly passing. Today a deposit is prospected very carefully before a plant is put up.

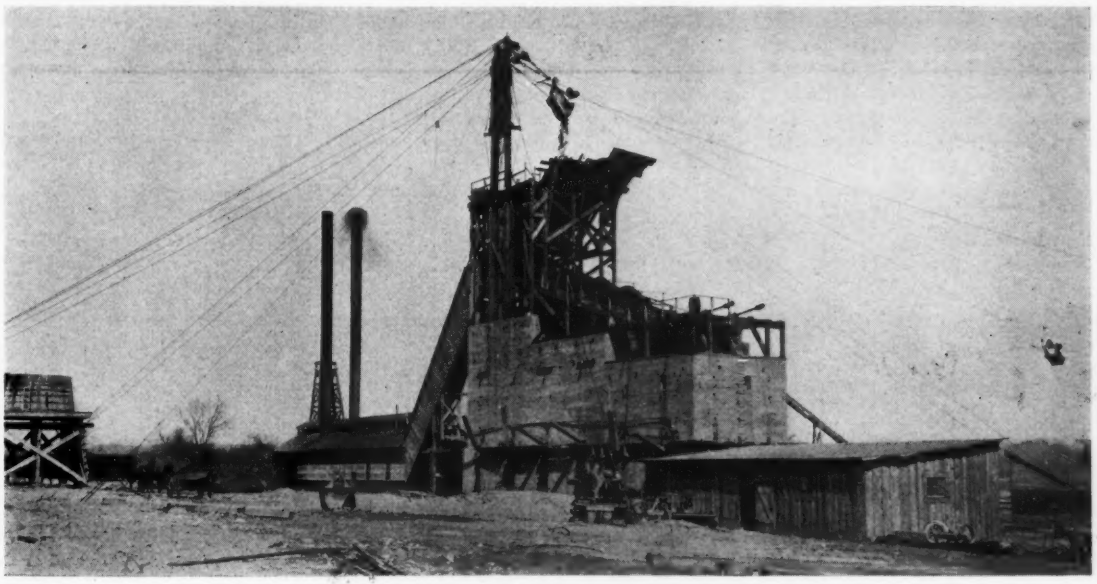
Recognizing the permanency of the sand and gravel business, the Continental Asphalt and Petroleum Co., Dougherty, Okla., has erected a very complete and up-to-date plant, at a cost of approximately $100,000, in what many consider one of the most extensive gravel deposits in the country. The plant is located in the center of a 6 sq. mile workable gravel deposit. This gravel deposit is in the heart of the Arbuckle Mountains, famed for its natural resources, such as sand-gravel, stone and asphalt.

The sand and gravel comes from a creek and is mined in either or both of two ways—dragline cableway excavator or steam shovel and cars.

Dragline Cableway Excavators

There are two dragline cableway excavators, each having a 16x16-in. mast, 102 ft. above ground level and 130 ft. above creek level. Each mast is trussed and supported by four guy wires, two of 1⅜-in. cable and two of 1¼-in. cable. The track line is 875 ft. in length, being of 1¼-in. cable, while the loading cable is 1100 ft. in length and of ¾-in. cable. On each dragline is a 1½-cu. yd. excavator bucket, which is operated by a 12x12-in. double drum steam-driven hoist, so situated that the operator has his controls at a point where he can get an accessible view of each and every operation.

As the material is excavated by the dragline buckets, it is dumped into a double V type hopper, approximately 73 ft. above ground level. The hopper is fitted with a grizzly, composed of I rails, spaced 10 in. apart. The material that is over 10 in. in size is broken up by a hammer. One man is stationed at this place at all times.

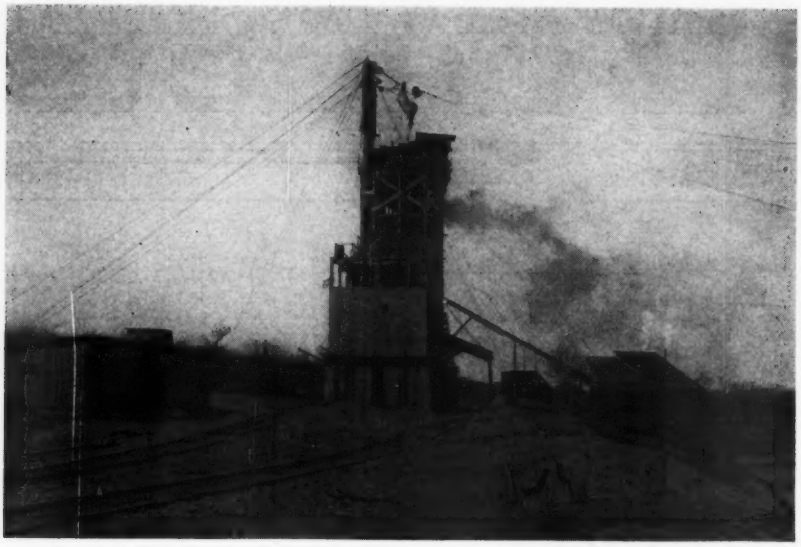


General view of plant and power house

Screening and Washing

The material is flushed out of the hopper with a 4-in. stream of water, after which it goes to either of two sets of screens for final sizing and washing. The screens are of the conical type, each set having four screens—No. 1 rejects over 2⅛ in., No. 2 retains above 1¼ in., No. 3 retains above ⅝ in. and No. 4 retains above ¼ in.

Rejections from the No. 1 screen (over 2⅛ in.) go to an oversize bin from the one fed out by a bin gate to a No. 6 gyratory crusher. This crusher reduces to 2 in. and smaller, the material being reclaimed by an elevator, with 2x6x9¼-in. buckets and 93-ft. centers. This elevator is of the chain type with malleable iron



Side view of plant showing loading tracks and screens. Note hoist house on either end of plant

buckets discharging into the same hopper aforementioned.

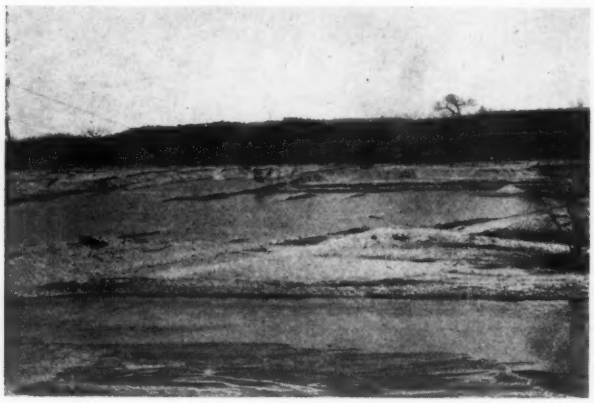
The material passing through the No. 1 screen falls on an inclined steel pan of the "hogback" type which delivers the material to the No. 2 screen, where it is sized and delivered to bins while the rejections are chuted to the No. 3 screen. From this screen the same process is kept up until the sand department is reached. The material coming from the No. 4 screen (under ¼ in.) goes over a perforated steel pan which allows the fine sand to pass through the fine-sand separator, while the remainder or coarse material goes to the coarse-sand separator. A flume is situated between the two separators which receives the dirty water and silt, delivering them back to the creek.

As has been mentioned, the function of the No. 1 screen is merely to separate the stone which must be recrushed. The No. 2 screen delivers its material to a bin of 250 tons' capacity, which contains stone from 2⅛ in. to 1¼ in. The No. 3 screen delivers to a bin of 200 tons' capacity, which contains 1¼ in. to ⅝ in. stone which the No. 4 screen delivers to a bin of 200 tons' capacity containing ⅝ to ¼ in. material. The fine-sand bin has a capacity of 150 tons and consists of material 1/16 in. and under, while the coarse-sand bin (¼ in. to 1/16 in.) also has a capacity of 150 tons.

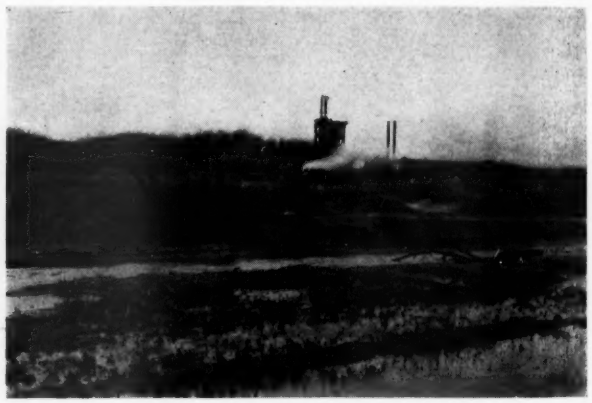
Standard-gage loading tracks are on either side of the bins, which are all concreted. The bins were originally designed to be of wood, but on construction, concrete was substituted. The bin walls are 1 ft. at the bottom and 8 in. on top.

Power Plant

The power plant consists of two 200-

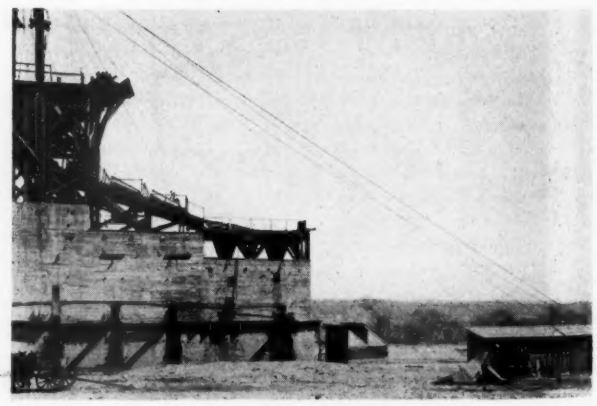


Character of deposit

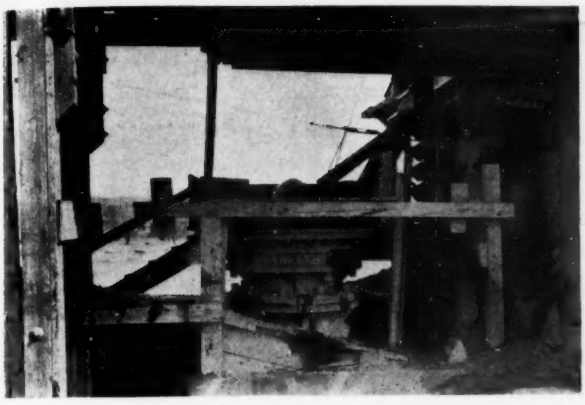


Steam shovel for bank-run gravel

View of plant from across the creek



View of screens and sand separators

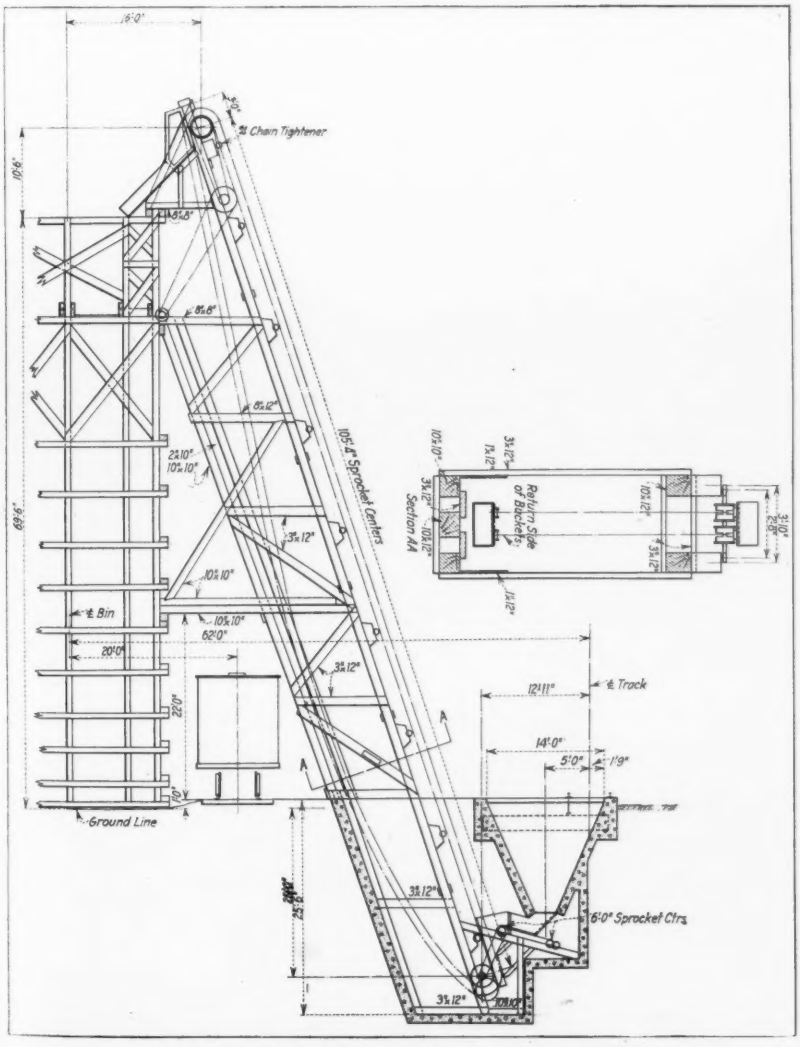


Gyratory crusher and bucket elevator

Steam engine and main jackshaft

h.p. water-tube boilers, which generate steam for the hoists, engines and pumps. The power for screens and crushers is derived from a 75-h.p. steam engine. It is first transmitted to a jackshalt from which the crusher is run and from which a rope drive transmits power for the screens through a set of bevel gear drives.

A 6-in. centrifugal pump driven by a 50-h.p. steam engine furnishes the entire water supply for the plant and the locomotive water tank. Water is forced through 1½-in. pipes, so placed that a jet of water plays on the sand and gravel as it cascades in the conical screen, thereby helping both washing and screening. The screens are also provided with mixing pans, as the accompanying drawings will show, so that any desired size of aggregate may be obtained. The plant has a capacity of 750 tons per 10-hour day, using the dragline excavators only.



Elevator for handling material from track hopper

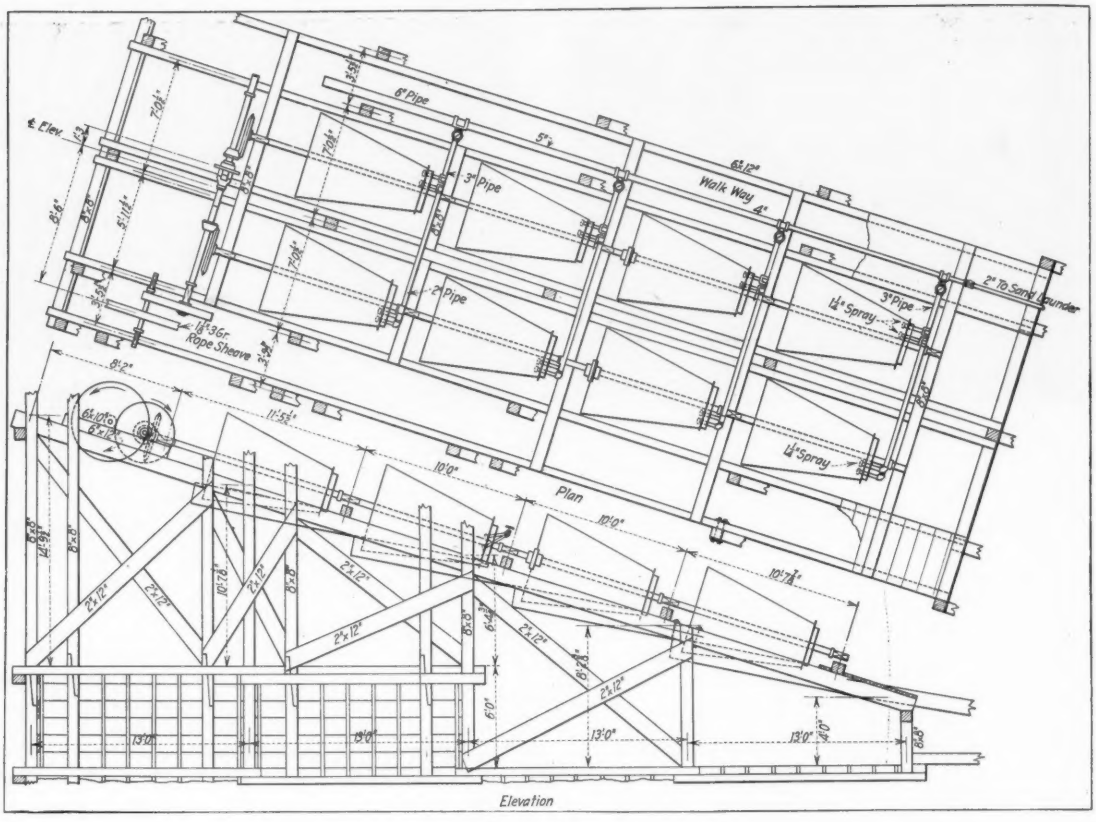
Steam Shovels and Cars

In order to enlarge its capacity and also to be independent of its dragline system in case of breakage, the company, at the time of the writer's visit, was installing a system whereby the material could be hauled to the plant by cars and locomotives and elevated to the receiving hopper.

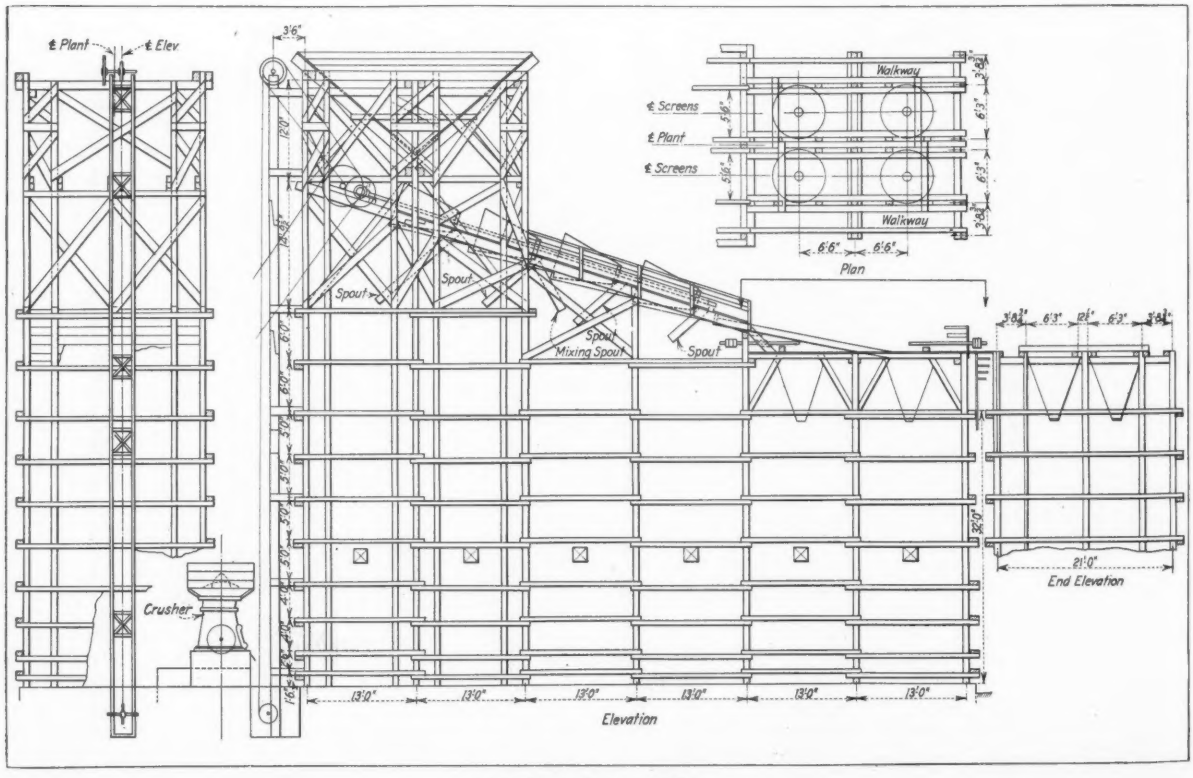
The company uses two light steam shovels, a 15-ton with ¾ cu. yd. dipper and a 20-ton with a 1 cu. yd. dipper for excavating bank-run gravel. These shovels load direct into gondola or open-top cars. They also load in 12 cu. yd. side-dump cars, which are transported by locomotives from the bank to the plant. The cars are dumped into track hopper, with grizzly bars over it, similar to that in the receiving hopper at the top of the plant. The material in the hopper is discharged onto a 30 in. x 6 ft. apron feeder, which feeds the material to a bucket elevator of 105 ft. centers, with 20½x9½x 11¾ in. malleable iron buckets mounted on a two-strand steel roller chain with a speed of 100 r.p.m. This elevator is inclined 60 deg. to the horizontal and discharges into the same hopper as the dragline cableway buckets. The elevator is run direct from the rope-drive pulley.

A 60-ton locomotive is used for switching purposes and also to haul the 12 cu. yd. cars. The company contemplates using another locomotive of lighter tonnage for hauling the small cars.

The distance from the creek to the plant varies from 1,500 ft. to ½ mile. A



Screen plan



Washing plant and bins

Rock asphalt quarry

Sand asphalt deposit

recent estimate assured the company of 3,000,000 tons of available creek-run gravel. As the plant proper is situated about one mile from the Santa Fe railroad main line tracks, it was necessary for the company to build their own spur to the plant. They now have six miles of railroad tracks in the hills. During the time of the writer's visit the company was installing a 100-ton track scale so as to facilitate quick shipments.

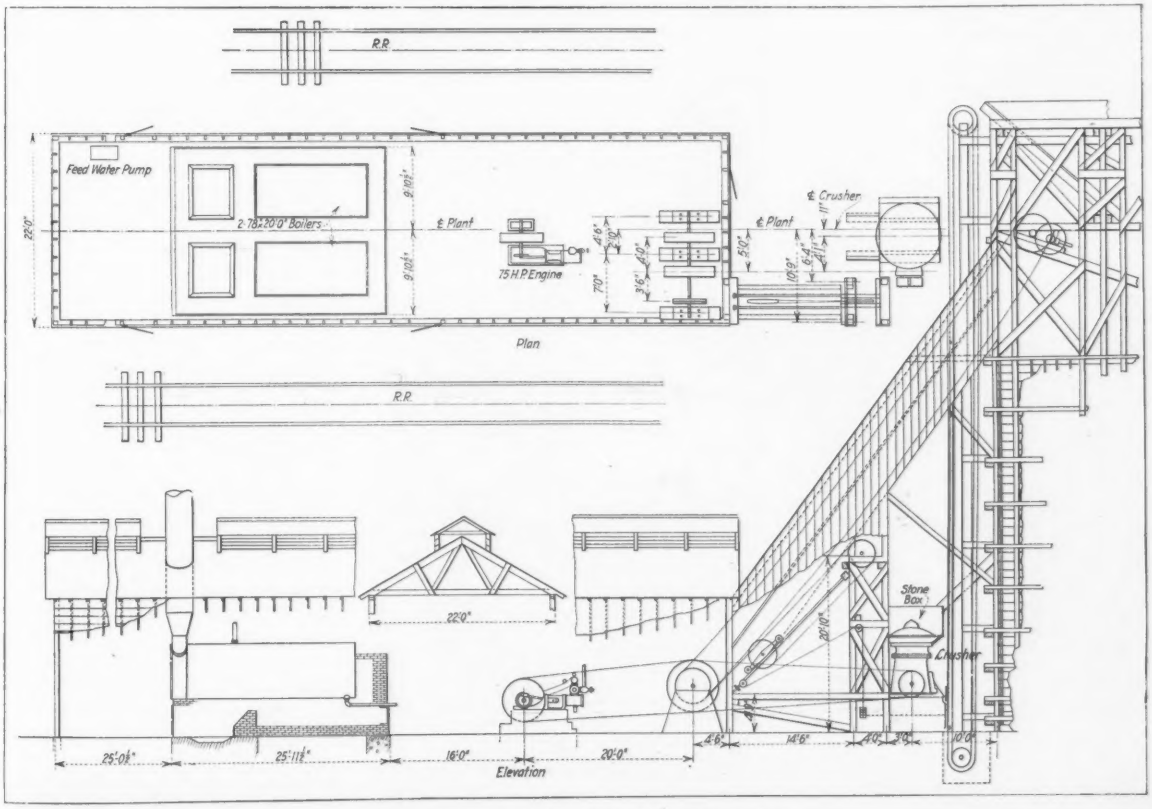
The washing plant and the dragline cableway excavators were designed and furnished by the Link-Belt Co., of Chicago, Ill.

Besides operating a sand and gravel plant, this company has one of the largest rock asphalt deposits in the country. The quarry is situated four miles from Dougherty and is reached by the company's standard-gage railway. The rock asphalt deposit consists of a limestone that has been impregnated naturally with liquid asphalt.

The superintendent of this plant is E. W. Foley, F. L. Donegan is assistant and R. B. Wolf is office manager. The main offices of the Continental Asphalt and Petroleum Co. are located in Oklahoma City, Okla.

Hearing on General Quarry Orders

DURING the past two weeks public hearings were held by the Industrial Commission of Wisconsin on proposed general orders on quarries at Waukesha, Fond du Lac and Milwaukee. These orders now go back to the advisory committee of quarrymen which prepared them for their final suggestions. The Industrial Commission also has under construction the adoption of a new safety code consisting of general orders on quarries.

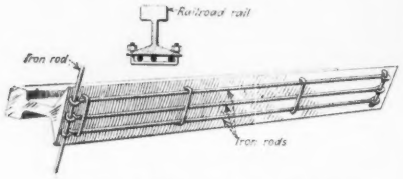


Arrangement of engine, jackshaft and crusher

Hints and Helps for Superintendents

Ore-Chute Device

IT MAY BE desirable to lessen the impact of the feed flowing to a coarse crusher. At one plant chains were hung in the feed chute and, these failing, 3-ft.



Crusher protector for ore chute

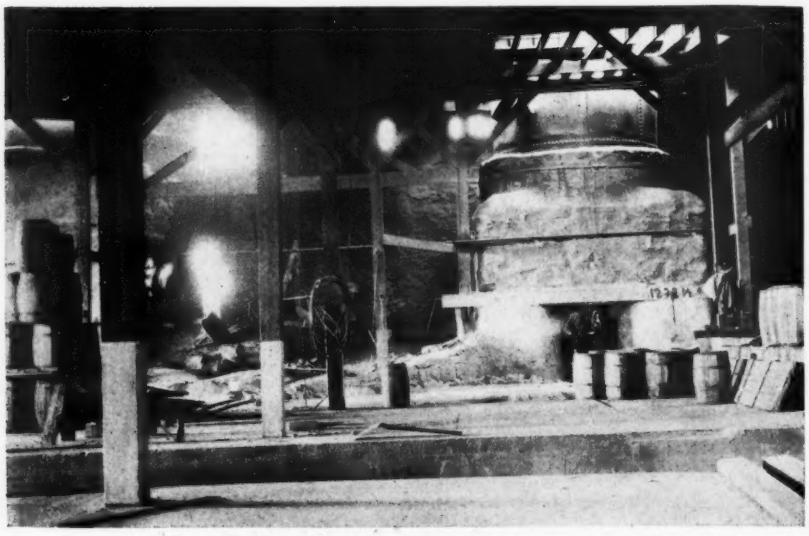
lengths of rail were suspended by one end. Both of these were unsatisfactory, as the breaking of either chain or rail permitted iron to enter the crusher, with consequent damage to the latter. Finally three rods were attached to each section of rail, as shown in the sketch. The device will hold the rail together, in case it breaks, thus protecting the crusher.—*Engineering and Mining Journal.*

Steam and Air Injector for Lime Kiln

LIKE MANY OTHER lime plants, those at Rockland, Me., of the Rockland-Rockport Lime Corporation use steam under the grates. It seems to be quite an ancient practice in this locality, dating back to the time when coal was first used in the furnaces in place of wood. It is quite generally considered that steam has a beneficial effect on the fire and draft, whatever its chemical effect may be. So it is primarily for draft that steam is used in this instance.

Steam jet operated air injector. Arrow indicates location of air intake on opposite side of furnace

The installation on these kilns is unusual in that the steam jet under the grates is used also to supply the fire with pre-heated air. As the view shows the steam pipe passes through a larger cast-iron air intake pipe, so that the effect of the steam jet is that of an injector, sucking in a considerable volume of air. But instead of taking the air direct from the outside atmosphere, it is taken in on the opposite side of the furnace and passed around the firebox, through a hollow arch and out and down the outside of the kiln, where the steam pipe is inserted. This arrangement serves the double purpose of pre-heating the air for combustion in the furnace, and of cooling and thus preserving the arch.



Type of kiln at Rockland equipped with steam-air injector

Formula for Strength of Rope

HOW strong is a rope? At the Bureau of Standards laboratories in the Department of Commerce, tests have been made that have resulted in answering that question with a formula.

For three-strand regular lay manila rope from ½ to 4½ inches in diameter, the following computation will give the breaking load of the rope:

The average breaking load in pounds equals 5,000 multiplied by the diameter of the rope in inches, multiplied by the diameter of the rope increased by one.

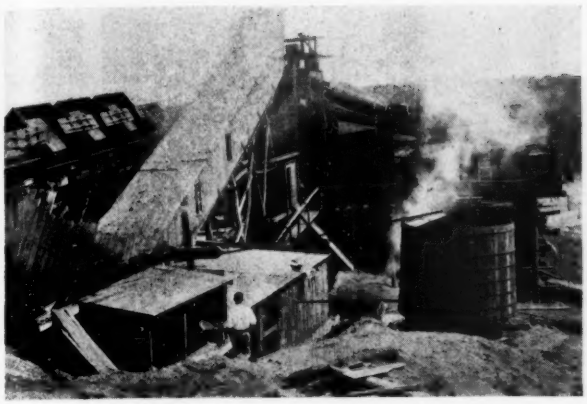
This will give, of course, the average maximum weight that the rope will hold, but the working load or the load that a contractor or safe-hauler may apply with proper safety and precaution would be considerably less than the load given by the formula.

Other data on rope are contained in Technologic Paper of the Bureau of Standards No. 198, by A. H. Stang and L. R. Strickenberg, which has recently been issued.

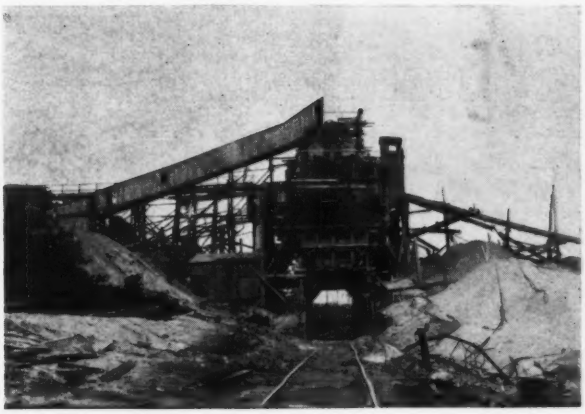
Kerosene-Engine-Driven Gravel Plant

POWER FOR an isolated gravel plant, where electricity is not available, is often a problem of considerable magnitude. The choice is generally confined to steam or oil engines with belt or rope drives, although a few plants make their own electricity and operate by electric-motor drives.

Herewith are views of the Bennett Gravel Co., Spring Lake, N. J., which, while not a very pretentious-looking affair, is reputed to be one of the most



General view of the Bennett Gravel Company plant



Screening and washing plant driven by two kerosene engines

efficient in the country. With an annual capacity of about 120,000 cu. yds., or 600 yds. per day, a total operating force of about seven men are required (including steam shovel and train crews).

Side-dump cars of the contractor or construction type are emptied into a large wooden hopper, from which the material is fed by a reciprocating feeder to a belt conveyor. This conveyor is on a 35-deg. incline and travels at the rate of 90 ft. per minute—an unusual installation, but said to be a very satisfactory one.

The belt discharges to a scrubber and a battery of conical screens, where a washing stream of 1,200 gal. per min. is supplied. Sand separation is made in Link-Belt sand-settling cones (formerly the Dull cone).

The conveyor belt is driven by a 25-h.p. kerosene engine, and the screens and pump by a 75-h.p. kerosene engine. Pressure on the water-supply for the plant is kept constant by an elevated tank shown in one of the views, while the smaller tank close to the plant supplies the cooling water for the engines. One engine is in the shanty at the foot of the conveyor incline and the other, with a centrifugal pump, is in the shanty adjoining the bins.

John M. Braly is general manager and Frank Travis is superintendent.

On the June day when the editor and H. D. Pratt, of the Link-Belt Co., dropped in to see this plant, it was running as smooth as a whistle and but two or three employes were in sight.

Water-supply tank for gravel plant—1,200 gallons per minute

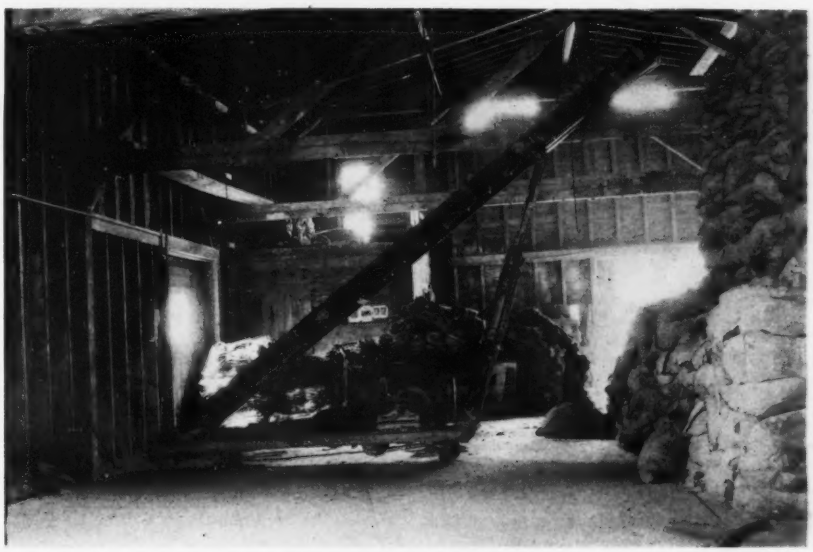
Lime-Bag Stacker

A TYPE of machine much used for handling bags of flour and grain, and a thoroughly demonstrated labor saver, is the bag stacker shown in the accompanying view. It is a special type of portable belt conveyor made by the Link-Belt Co.

This conveyor is mounted on a truck with an electric motor. The frame may be raised and lowered to stack bags up to a height of 25 or 30 ft. It is shown here at the plant of the Rockland-Rockport Lime Corporation stacking burlap bags of agricultural lime.

It is said to handle paper bags of hydrate equally well.

This is the only instance of the use of a machine of this kind in a lime plant that the editor has seen, but here, at least, it seems to fill a very important place in the scheme of operation.



Bag stacker in a lime plant

Sand Settling and Sand-Settling Devices

Part II. No. 12. Classification—Hindered Settling

By Edmund Shaw
Allen Cone Co., El Paso, Tex.

IN THE FIRST PAPERS of this series mention was made of the effect of grain crowding on the settling rate of the grains. This effect always is to be found to a greater or less extent in all forms of settling devices, but in the types which have been so far discussed it is so small that it is ignored, and such types are called free settling devices.

Nevertheless, the effect is there, and the designer of classifiers have to take it into account. With ordinary dilutions and grains of the diameters met with in classifying crushed ore, it may amount to 10 per cent—that is, the theoretical falling rate may be said to be reduced 10 per cent by the effect of the other grains.

Settling in a Confined Space

The classical experiment which is performed to show the effect of settling in a confined space is that of dropping shot of various diameters through a glass tube filled with water. Suppose that it begins with a shot that is so nearly the diameter of the tube that it will just enter. If this same shot were to be dropped into a large vessel of water, it would fall at the rate of several inches a second, but in the tube it falls very slowly, or not at all.

It is easy to see the reason for this. The shot in falling has to displace the water below it, and this displaced water must rise in the space between the shot and the tube. If there is no space, the water cannot rise, and if the space is very small it must rise very slowly, and hence the shot must descend very slowly. If, for the next text, a slightly smaller shot is used, it will be found to fall faster than the first, even though it is smaller, for the displaced water has a better chance to rise. By continuing to test with shot, each a little smaller than the preceding shot, we finally arrive at a size which will fall with so nearly the same speed as the settling rate in a large vessel that we cannot measure the difference, and we say then that it is falling at the free settling rate.

Fall of Grains in a Mass

A mass of grains will fall in water as a unit, the small grains being dragged down by the large grains, so that they fall much faster than their regular settling rate. Advantage may be sometimes taken of this fact, where it is desired to remove sand from clayey water, for example. And it is also true that a mass of grains will rise as a unit. This may be well illustrated with a glass tube used as the sorting tube of a classifier. If the bottom of the tube is kept closed and a rising current of low velocity admitted, grains will enter the sorting tube and dance in it, as we have seen grains of sand dance in a spring. More grains will enter, and finally a mass of dancing grains is formed, and then the grains will suddenly rise and pass out of the sorting tube, leaving it empty. The experiment may be repeated as many times as desired, the grains accumulating slowly and forming a mass, and then being expelled.

Forming a Hindered Settling Column

If, when we have such a mass forming, we cut down the amount of rising current water, so that it no longer has the force to expel the mass as a whole, we will see a very pretty change take place. The grains in the mass will settle nearer together, and while each is dancing, or "teetering," in its own little space, it will be seen that the grains have arranged themselves according to weight. The heavier grains are at the bottom and the grains are graduated in size up to the finest, which are at the top. If we push one of the grains which is half way down clear to the bottom, we will see it rise and resume its original position, and if we lift one of the large grains from the bottom to the top of the mass it will find its way back to the bottom again. Such a column is said to be stratified.

This stratification is true hindered settling, and the mass formed in this way is called a hindered settling column. It is classification, because the grains are separated into strata according to their weights, each grain going with grains of the same weight, but it is classification of a different sort from that which we have been considering.

Separation of Minerals by Hindered Settling

This hindered-settling principle finds its principal application in the separation of one mineral from another. Suppose we had a lump of mixed quartz and galena (lead ore) and we wanted to get the galena away from the quartz. Now galena is much heavier than quartz, as it has a specific gravity of 7.5, while quartz has only 2.6. We can take advantage of this difference to make a separation by hindered settling.

We first break up the lump of ore into grains like fine sand. Then we put it in a tube and form a hindered settling column in the way we have described. The heavy galena will be found at the bottom and the lighter quartz at the top. If we have a stop-cock arranged to draw off the contents of the column carefully, we will be able to get the galena away from the quartz in a fairly pure state.

If we repeat the experiment, and add some grains of coal, crushed to the same size as the other minerals, we will have a three mineral separation. The coal will be at the top. (Coal has a specific gravity of about 1.3.) The quartz will be in the middle and the galena will be on the bottom.

Jigging of Coal and Ore

This little experiment illustrates the way coal is washed, to separate it from slate and "sulphur," as the miners call pyrite, and other ash-forming materials, and also the way that lead and other ores are "dressed" so as to form a product which will be rich enough to smelt profitably. There is a laboratory device which consists of a hindered settling column and a stop-cock for drawing off the minerals, as has just been described, which is regularly used for testing ores, to see how good a "recovery" can be made from them. But the practical machine for applying the principle is the jig.

A description of the jig does not belong in these articles, as the jig is a concentrator and not a classifier, but a few words will suffice to explain how it works. There are two boxes, or cells, connected at the bottom, so that water may easily flow from one to the other. At the bottom of one cell is a screen, on which the mass of finely divided ore to be separated rests. In the other cell is a piston, or plunger, fitting somewhat loosely. An eccentric and connecting rod moves the plunger up and down. The down stroke of the plunger forces the water through the screen and lifts the

mass of ore, which stratifies itself according to the principles of hindered settling. The upstrokes perform a useful function, too, for they cause a suction that pulls the fine grains of heavy mineral down between the lighter grains of quartz, so the separation is helped in that way.

The jig is interesting because it is one of the oldest devices used in the treatment of ores. Perhaps the only device that is older is the riffle, or the sheep skin, which the ancient miners used to lay in the bottom of a small stream to catch the fine grains of gold.

Hindered Settling Classifiers

As compared with free settling devices, hindered-settling classifiers have not been very much used. Professor Richards designed one now on the market which is said to give very good results. But by far the greater part of the classifiers used are those which employ free settling principles, probably because the men who use them understand free settling better, and the results have been found to be sufficiently satisfactory.

Temperature Measurements

No. 3—Uses of Smoke Thermometers, Mercury Pyrometers, Draftmeters

THERE now remains to be considered the instruments employed to take the measurements that have been discussed. For the most part, the industry is so familiar with them that a mere enumeration will suffice.

For determining temperatures in the preheating zone smoke thermometers are employed. These thermometers are lowered to a certain depth in the stack by means of a long chain. They are kept at this depth for a time and retain their temperature long enough to be withdrawn and read. The ability of these thermometers to retain their temperature is due to insulating the quicksilver bulb and the presence of heat storage in the shape of heavy brass at the lower end of the tube. These instruments can also be used in reading the temperatures of the stack-gas inasmuch as the tubes are drawn of special glass and under special precautions and can be exposed to temperatures as high as 600 deg. C.

For continuous measurements in the preheating zone, however, the so-called mercury pyrometers in steel tubes are used. Their length varies from 30 in. to 8 ft., according to the size of the kilns or the thickness of the kiln walls. These pyrometers have the further advantage that they can be so connected with a registering apparatus that the processes can be reviewed at any time. Corresponding measuring appliances are recommended in the stacks of vertical kilns.

In the calcining zone in vertical kilns the measurements are best made with the resistance pyrometer. It has the advantage of being easily transportable and always ready for use; it is not heated to such temperatures that it deteriorates very rapidly and it is considerably cheaper than, for instance, the Le Chatelier pyrometer, whose essential part is the platinum-rhodium thermo element.

The principle of the resistance thermometer is that of the Wheaton arch. Within the apparatus a system of resistances are so provided that an electric current conducted through it must take a definite circuit at a given amount of heat radiated to the elements.

Use of this pyrometer necessitates a bore hole through kiln walls to the hottest part of the burning zone. This hole is inclined downward to prevent the lime or stone from being pressed into it and is also enlarged where it penetrates the wall inside. The apparatus is then placed into the hole in such manner that it can be packed with asbestos to prevent the least draft through the opening; this would naturally reduce the temperature to which the instrument is exposed.

Light rays from the burning zone, striking some of the resistance elements, heat them, and this heat is transfused evenly to all of the elements; the electric current is deflected accordingly. The intensity of the light rays depends on the degree of heat attained in the kiln. The instrument is remarkably simple and is always ready for use. When the bore holes are provided at several kilns the pyrometer can be moved readily from one to another. The galvanometer indicating the temperatures can be ready at all times or can be attached to a registering mechanism. It is further possible to have three or four pyrometers register on the same drum or disc simultaneously.

Measuring the draft is a simpler matter. The well-known "Obel" draftmeter is employed (a special pattern for the stationary fires of vertical kilns). The peculiarity of these instruments lies in the fact that they are very delicate; as registering apparatus they furnish a perfect guide to the work of each shift. The value of this can scarcely be over-estimated; in plants employing three shifts at the kilns it is a great help in supervision. It is true that the firemen or burners themselves do not take kindly to such supervision until they learn that the mute testimony of the register places the blame where it properly belongs; that no one shift can be blamed for the negligence of any other. The many different adaptations of the Obel draftmeter make it suitable for all kinds of kilns and stacks.

To measure air currents, say, with forced draft, anemometers are employed together with the draftmeters. They do not measure the pressure of the gases but the current of the air of combustion or of the gases produced by combustion. However, they are not kept continuously in service, but only at times, to control the draftmeters. When draftmeters are installed it is expedient to determine by means of an anemometer what movement of gases is represented by various pressures indicated on the meter. These pressures and the corresponding currents are easily tabulated and tables furnished to the burners or foreman to ascertain at any time the movement of gases through the kiln.

The manner of employing a stack-gas-apparatus depends on the size of the plant. In some cases a Cramer instrument to determine the carbonic acid will suffice; but in operations where stress is laid upon close supervision of all processes, the well-known and efficient Orsat apparatus can hardly be dispensed with. The use of this instrument can be taught to anyone with the least skill and ingenuity.

Another instrument recently come into prominence is the Ados apparatus, which constantly registers the carbonic acid content in the escaping gases. In the lime industry such an instrument is recommended only when the gases must contain a minimum of CO_2 to permit their use in other operations. Where this is the case the cost of the Ados instrument is quickly regained under the present economic conditions.

(Concluded)

Rates Based on Value of Commodity

BY A SERIES of orders just issued the Interstate Commerce Commission has given permission to a number of Western railroads to fix their freight rates on ores in accordance with the value of the material shipped. The roads will be required to file schedules for approval, however, before the change goes into effect.

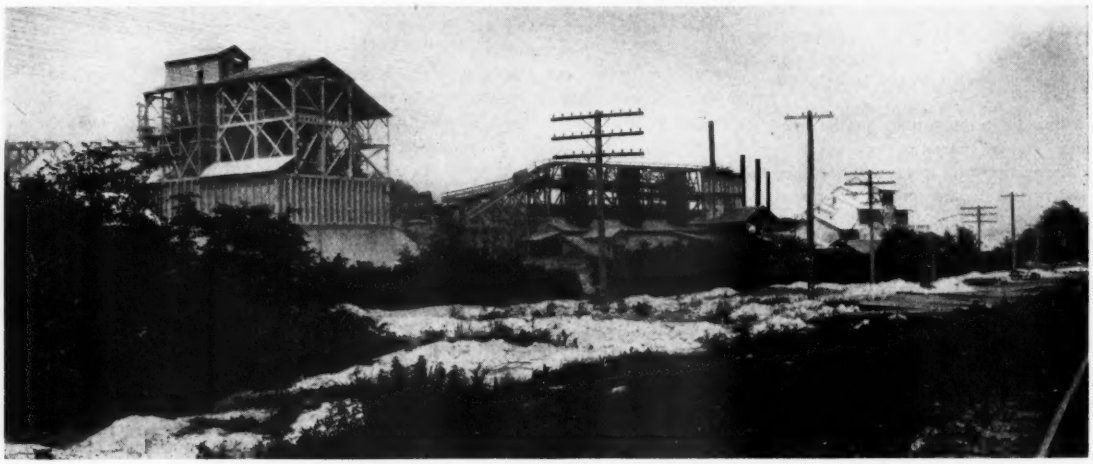
By this act the railways have established a precedent that should be seized upon by shippers of sand, gravel, crushed stone and slag. Always heretofore railway traffic men have argued that any basis of rates based on the value of the commodity was unthinkable. Now they have themselves established the prime reason why rates on mineral aggregates should be the lowest in the schedule.

Pioneer Texas Lime and Crushed Stone Plant

Dittlinger Lime Company, New Braunfels, Texas—One of the Largest Producers of Lime and Crushed Stone in the South—History of the Development of the Company

THE STATE OF TEXAS is nothing if it is not large. Few people conceive the greatness of this state and one can only realize by taking a pair of dividers and setting them on the southern and northern boundries of a map and swinging them around will almost land one in Canada; doing the same thing east and west will put one near the Atlantic and Pacific Ocean. One can travel on a fast train for more than 24 hours in a straight line and never get out of the state.

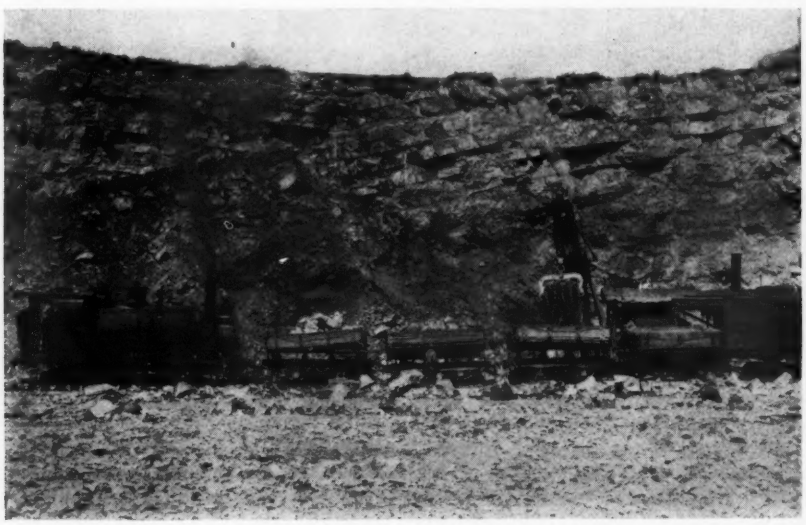
A state like this should be a good consumer of lime. This was the conclusion of the men who formed the Dittlinger Lime Co. at New Braunfels, Tex., in 1906. It looked very reasonable, too, for at that time Texas was just in the stage of development and government reports showed that the consumption of lime within the state was steadily increasing. Also, Texas being one of the least developed states in the country, though the largest, should continue to increase its consumption of lime.



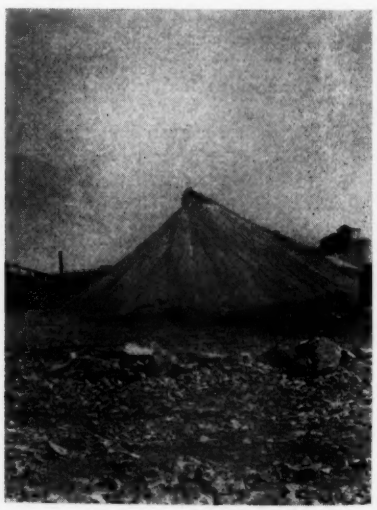
Dittlinger Lime Company—general view

History of Development

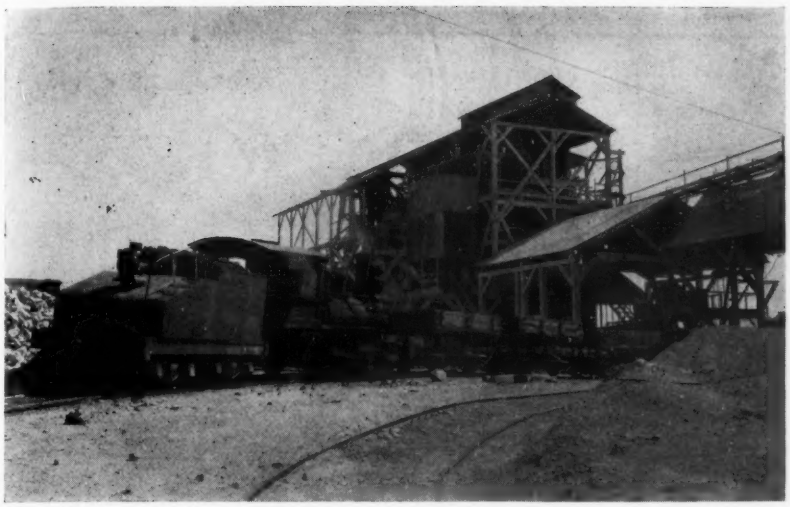
The plant, as started, had only two kilns. It had no crushing plant, as labor



Steam shovel loading



Waste pile in quarry. Note overhead belt conveyor from plant



Train leaving crushing plant

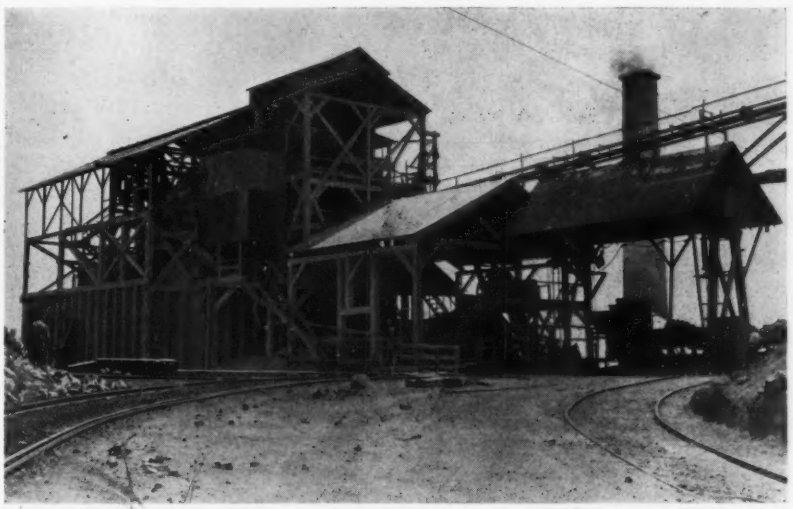
was exceedingly cheap at that time, so hand work could be tolerated. When this company started to go into business they investigated the most modern methods at that time, being desirous of having an ideal plant.

Very unfortunately, their investigations brought them in communication with a company, who at that time, were making great claims of having a patented process of burning lime with producer gas, which was to be made by using part of the stack gases as a diluent in the gas producer and the kiln proper. The theoretical principle looked very plausible, but in practice it proved a total failure, causing great financial loss to the company.

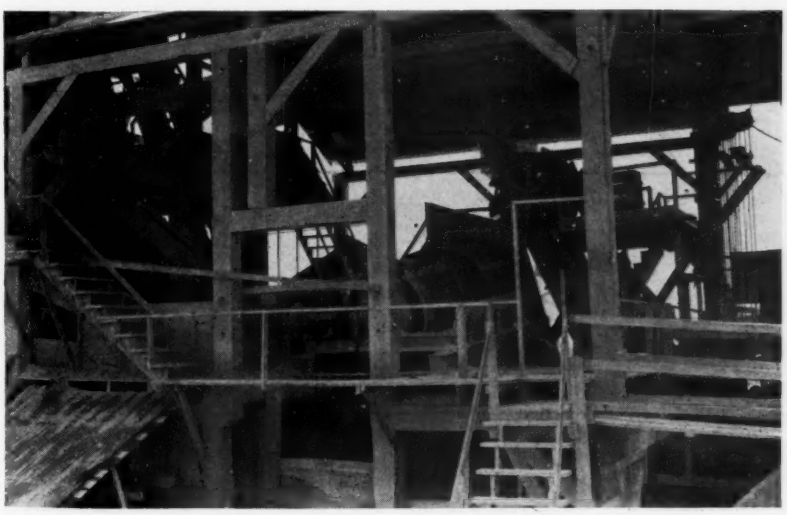
However, this did not prevent the company from going ahead and after discarding the stack gases and replacing them with steam blowers they solved the problem of burning lime with producer gas. In the course of years the gas producers were also discarded and the kilns were converted to the direct-fired furnace type, lignite being used for fuel. The latter proved to be the most satisfactory arrangement of all.

The Dittlinger Lime Co. have the distinction of being the first to install a hydrating plant south of St. Louis, Mo., and west of the Mississippi river. After the hydrating plant was built the company experienced considerable difficulty in marketing their product. Hydrated lime was unknown in that territory and the company soon realized that if they ever expected to sell hydrated lime it was up to them to create a demand for their product.

Creating a demand for their product was not so easy as it might seem. It involved considerable promotional work so that prejudice and ignorance could be conquered. How well the Dittlinger Lime Co. succeeded is evidenced by the fact that today they ship hydrated lime to every part of Texas as well as Oklahoma, Louisiana and New Mexico. Thus, it can be readily seen that the Dittlinger Lime Co. really introduced hydrated lime in the West.



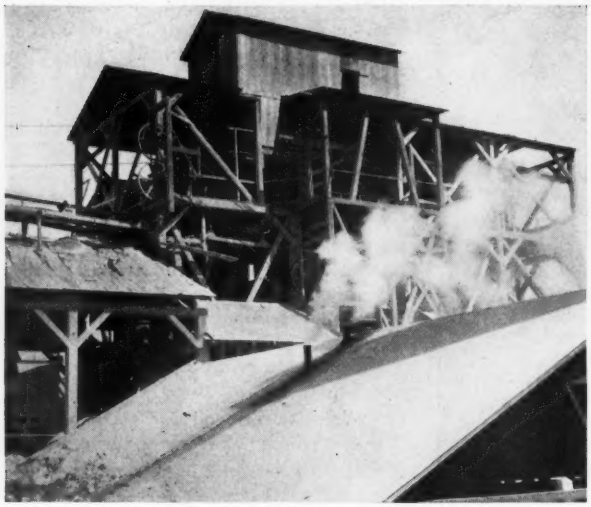
Cars entering initial crusher platform



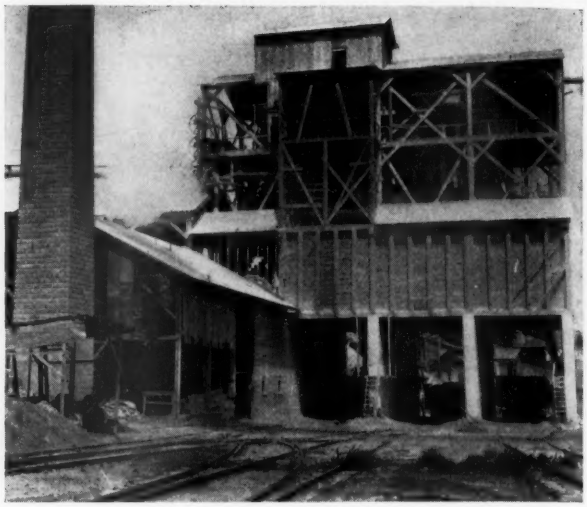
Scalping screen and bucket elevator from initial crusher

Development of Crushing Plant

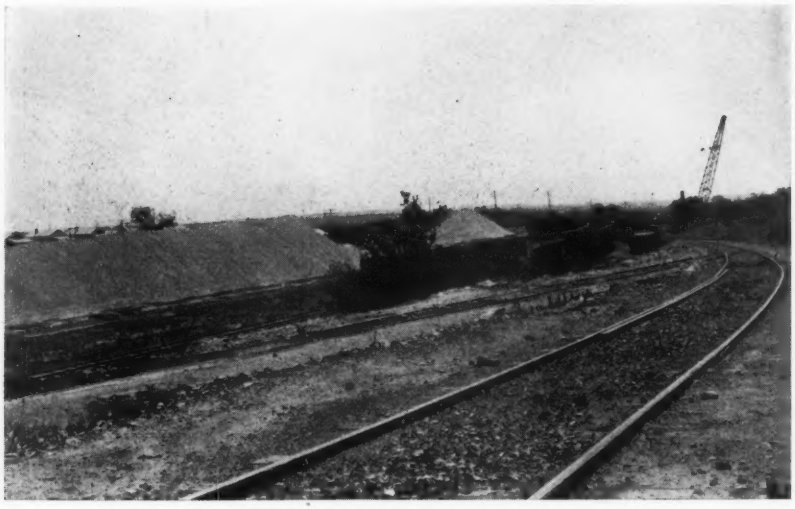
In the quarrying of their deposit, the company found considerable stone that was unsuitable for lime burning. The company had no crushing plant at that time, so the stone was discarded and regarded as waste. At this time such cities in Texas as Dallas, San Antonio and Ft. Worth were going through a period of phenomenal growth. New structures were being built and the demand for material began to exceed the supply. The Dittlinger Lime Co. took advantage of the situation and built a crushing plant, which relieved them of all the waste they had formerly encountered in the way of



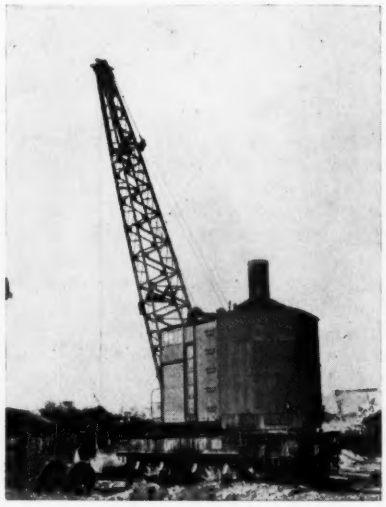
View of crushing plant



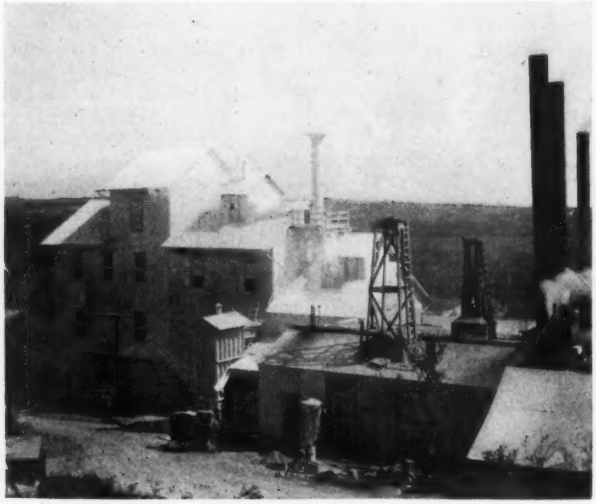
Crushing plant showing concrete passages for cars



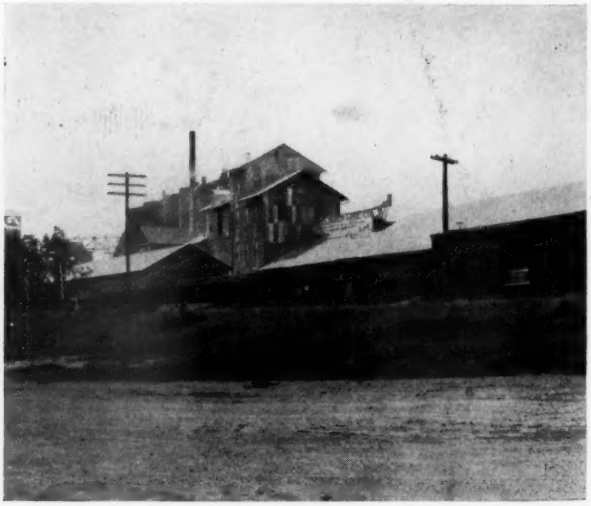
Portion of ground storage



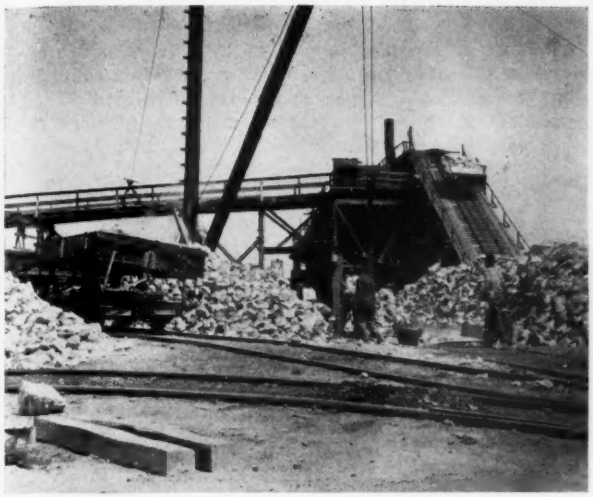
Locomotive crane for rehandling



View of hydrating plant

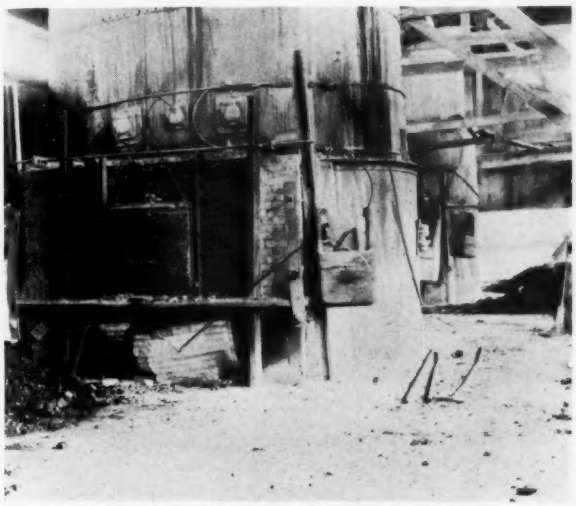


Loading platform and hydrating plant



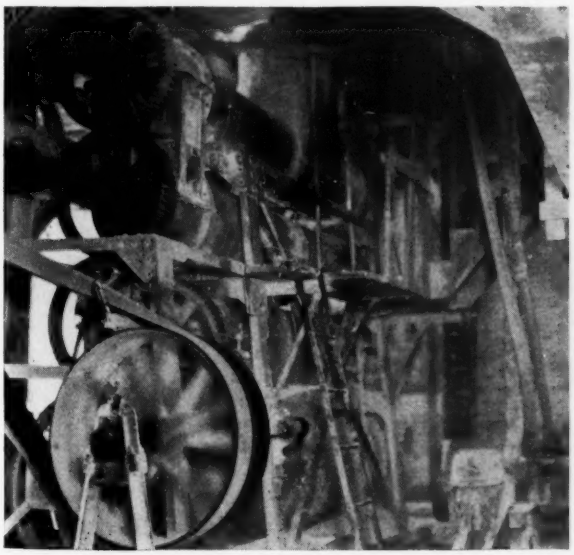
Stiff legged derricks and incline to top of kiln charging hoppers

Battery of kilns—two to the extreme right of late construction

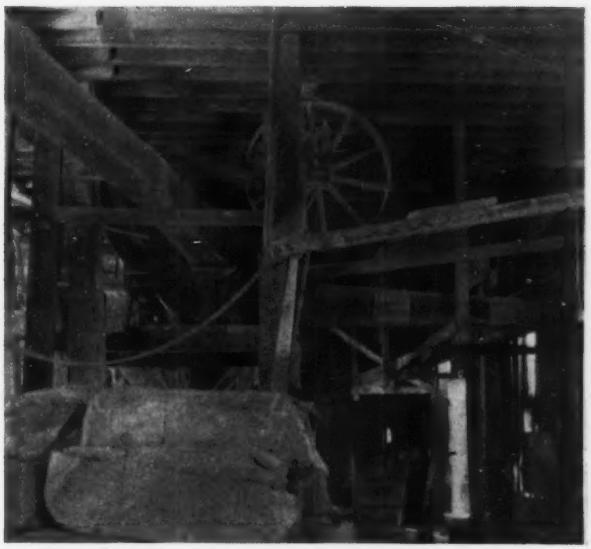


Furnace for lime kiln. Note furnace door

Cooling floor showing coring operation



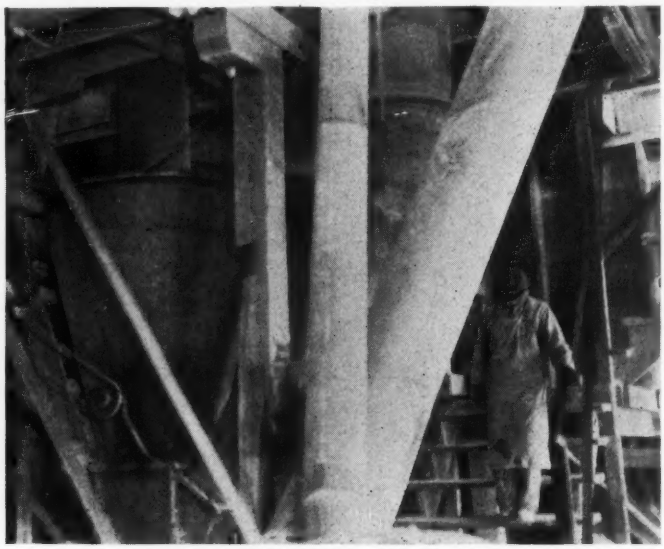
Kritzer hydrator



Ventilation system in packing room

spawls, made their lime operation much more economical and gave them another great source of revenue from the sale of crushed stone.

In the manufacture of crushed stone the company found themselves accumulating a considerable pile of fine crushed stone for which they could find no sale. Again, the company proved their promotional spirit by going out and placing agricultural limestone on the market. They met with but little success, however, for the country was so new that there was practically no market. However, the Dittlinger Lime Co. have the distinction of having introduced agricultural limestone in the Southwest.



Dittlinger Lime Company's air separator

Limestone in Texas

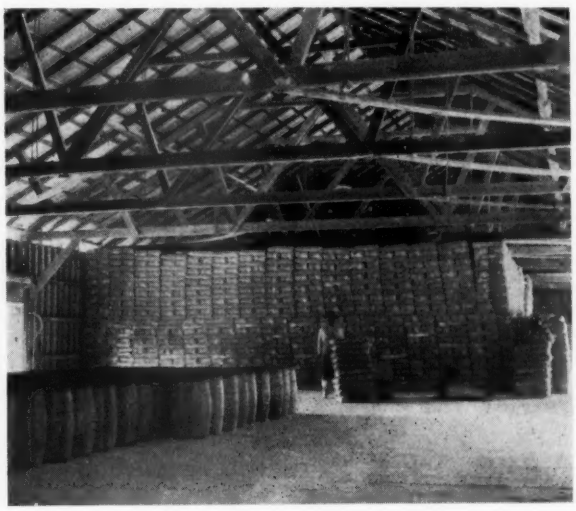
The limestone region in the state of Texas, great as it is, is limited. It extends from Sherman in the northeastern portion of the state to San Antonio, south, and El Paso, west, and from there back to Sherman. While this large territory contains inexhaustible deposits of limestone, not a very large portion of it is suitable for the manufacture of lime. The reason for this is that very large portions of the deposits are of the soft chalk variety of limestone which will not burn well, though the chemical analysis is approximately the same as the harder crystallized varieties. Undoubtedly, the rotary kiln would be just the thing for this soft, chalky crumbling limestone. Whenever the crystallized formation of limestone is found it shows a high percentage of calcium carbonate. The stone at the Dittlinger Lime Co. quarries average from 98.5 to 99.3 per cent calcium carbonate.

Quarry and Quarry Operation

The quarry of the Dittlinger Lime Co. is of a hillside formation, being some 14 acres in area, with a face 1,500 ft. in length and 65 ft. high. It is not marked with plain or distinct stratification. The face of the quarry is in the shape of a loop and is followed by a standard gauge track. The quarry requires no stripping of overburden.

For blast holing three well drills cutting a 6 in. hole are used. Of the three drills, two are gas operated and the third steam operated. The holes are drilled 15 ft. back from the face and 12 ft. apart to a depth of 60 ft. They are loaded with dynamite cartridges, about 200 to 250 lb. being placed in each hole and detonated with Cordeau-Bickford.

The blasted stone is loaded into 6 yd. side-dump cars by either of three railroad type steam shovels, there being a No. 61, No. 43 and No. 40, with a 2 cu. yd. and two 1½ cu. yd. dippers, respectively. For cleaning the quarry floor and breaking ground for new tracks a small traction type steam shovel is employed. The haul from the steam shovels is made by a dinkey which delivers the product to the initial crusher. The company has three locomotives, a 36 ton locomotive and tender and two 30 ton saddle-tank locomotives. The complete circuit of locomotives and quarry cars is over a distance of one mile. The quarry floor is fairly level, the steepest grade being only 3 per cent. The brakeman of each locomotive crew hand-picks the stone suitable for burning lime during the haul to the crusher and deposits it in a pile near the incline leading to kiln charging hoppers.



Storage room. Note cleanliness

Crushing Plant

On arriving at the crushing plant the cars are side-dumped into a No. 12 gyratory crusher. It is reclaimed from here by a bucket elevator and deposited in a 48 in. x 24 ft. jacketed scalping screen, with 1½ in. perforations at one end and 2½ in. at the opposite end. This screen eliminates the dirt and oversize stone, the oversize going to three No. 5 gyratories for recrushing. The dirt is reclaimed by an elevator and deposited on a belt conveyor, which takes it to the waste pile in the quarry. Considerable of this dirt finds a market as railroad ballast.

The material passing through the scalping screen and the stone from the three No. 5 gyratories is reclaimed by one bucket elevator, which delivers the material to either of two rotary screens, one being 48 in. x 24 ft. and the other 48 in. x 7 ft. The first screen has 1½ and 2 in. perforations and the second ½, 2 in. and 2½ in. perforations.

The material from screen No. 1 goes

direct to the bins located underneath it and by means of chutes any desired mix may be obtained in a bin. The material from No. 2 screen goes to a shaker screen located underneath it, which separates material 1½ in., 1 in., ½ in. and ¼ in., delivering these sizes to their respective bins. The stone under ¼ in. is taken up by a bucket elevator and deposited in a Tyler "Whip-Tap" screen, which separates to 60 mesh. This material is sold for agricultural limestone purposes.

The plant is very flexible and almost any desired size of aggregate can be produced. It has a capacity of 1,500 tons of crushed stone per day, with a bin storage of 500 tons and a group storage of from 35,000 to 50,000 tons. The stone in the ground storage is stored with respect to the various sizes and is reclaimed by a 20 ton locomotive crane with a 2 yd. clam shell bucket which deposits the material into cars for shipment. The crushing plant has three reinforced concrete passageways for car loading from bins.

Lime Plant

The five lime kilns are of rectangular cross section, being 5½ ft. wide and 7 ft. long. The kilns extend 42 ft. above the firing floor, which is 12 ft. above the draw floor. Each kiln has two fire boxes and lignite is used for fuel. The kilns are of the company's own design and construction. Kiln construction is a much disputed field and every lime burner has some pet kiln that is just a little better than that of the other fellow. This company is a firm believer that if a man has a certain size kiln and experience has taught him how to fire it and get the best results, he will make a good lime and make it reasonably economical, where another man who has not had any experience with the kiln will waste fuel and not get any results.

The stone from the pile stored for lime burning is put on skips, which are placed on side-dump cars by a stiff-legged derrick. This operation takes place near the foot of the incline leading to the kiln charging hoppers. As soon as a car is full it is hauled up the incline by a hoist, spotted near some kiln and dumped into the charging hoppers. Of the five kilns, four have open tops and one a stack with a charging door.

The kilns are drawn every four hours, about 3,720 lbs. being taken to a draw. They are operated 24 hours a day and seven days a week. The cooling hoppers on the kilns are of steel plate and are unlined. Each hopper has a sliding gate for a draw shear, which is operated by rack and pinion. The lime is drawn into wheelbarrows and deposited on the cooling floor, where it is cooled and then packed in barrels, shipped in bulk or deposited in a small pot crusher, where it is crushed for passage through the hydrating plant.

Hydrating Plant

The crushed lime from the pot crusher is reclaimed by a bucket elevator and deposited in a bin over the hydrator. The hydrator is of the continuous operated type and has a capacity of approximately three tons per hour. After hydration the lime is conveyed to a Raymond mill and air separator, from which it is carried to a bin above a four valve bag packer. The bagging room is of special interest because of its ventilation system, which was explained in the "Hints for Superintendents" department of ROCK PRODUCTS in the July 5, 1920, issue. The total capacity of the hydrating plant is 36 tons of hydrate per day.

Power Plant

The power plant consists of two 60x16 ft. tubular boilers, 150 h.p. each, direct fired type, lignite being used as a fuel. These boilers generate steam for two Corliss engines, 125 and 150 h.p., which furnish the drive for the crushing plant. The lime plant has its own power plant, there being just one boiler and a small steam engine. The company have their own repair shop and cooperage shop. The plant is located on the I. & G. N. R. R.

Personnel

The Dittlinger Lime Co. stands today as the only plant in Texas producing agricultural limestone and also the only lime plant that is in the rock crushing business also.

The entire plant of the company is now doing fine work, but it has been a succession of problems to be solved, and it is due to the resourcefulness of the company's vice-president and general manager, I. A. Ogden, a man of wide experience in the milling business, that all obstacles in the successful manufacture of lime have been surmounted. If it had not been for his efforts this plant might spell failure instead of success today. Mr. Ogden has been with the Dittlinger Lime Co. for the past 27 years.

H. Dittlinger, from whom the company takes its name, is president and comes from an old family, his father having been in the lime business at Cape Girardeau, Mo., before the civil war. E. Eikel is secretary of the company and R. H. Wagenfuehr, treasurer.

Agricultural Limestone Association Meeting

AT the November meeting of the executive board of the National Agricultural Limestone Association, held in Cleveland, there were present:

Clyde Calvin, Bessemer Limestone & Cement Co., Youngstown; Harry Brandon, Ohio Marble Co., Piqua; W. M. Margraf, Marble Cliff Quarries Co., Columbus; J. C. King, Carbon Limestone Co., Youngstown; R. J. Fuller, Columbia Products Co., Cleveland; A. P. McCallie, E. M. Lamkin, C. J. Starrett, Kelley Island Lime & Transport Co.; R. J. Fuller, Jr., Columbia Products Co., Cleveland, and A. P. Sandles, secretary. Chairman Brandon presided.

The secretary reported that the Ohio State Utilities Commission had reduced Agstone freight rates 28 3/10 per cent; this removes the 40 per cent increase added August, 1920. He has also received a copy of the Ohio Farm Bureau Federation petition to the Central Freight Association for reduction in rates on Agstone moving between points in Ohio. This petition justifies Ohio in asking rate reduction on Agstone.

Chairman Brandon said: "Reduced Agstone rates will be effective on November 23, but very few farmers will purchase Agstone until the new rates are in force, and our November tonnage is sure to be small."

It was the contention of Messrs. Calvin and Lamkin that the National Association should seek a general rate reduction through the Interstate Commerce Commission, so that interstate shipments would get reduced rates.

Chairman Brandon stated that the Association should try to sell a good agricultural program as well as try to sell Agstone; alone, it was not a cure for all the ills of the farm and farmer. There should be drainage, crop rotation, etc.

A round-table discussion was had over the educational efforts of the Association over the following points: Frank, cooperative spirit among the members; cooperation with all organized agricultural agencies, schools and colleges, soil experts, extension workers, farm bureaus, experiment stations, etc.; carrying the message to the farmer himself; a policy of inspection and chemical analysis that will insure fair and accurate testing of all agricultural limestone; a program for permanent agriculture that will include an application of Agstone and plant lime at regular intervals; legislation to secure lower freight rate levels on inter and intra state movements; a policy of selling through local agents and dealers, who will keep the production in storage for sale and delivery; conducting demonstrations in territory where educational work is needed; stabilizing our industry.

Everyone present agreed that every member should under no circumstances sell or deliver any inferior product; that a square deal to the farmer would do more to insure the welfare of the industry than any other policy pursued.

Quick-Hardening Cement Developed by the French

A New Fused Product of High Alumina Content Should Prove of Value in Many Kinds of Construction

IN THE COURSE of the World War a cement of very remarkable type and properties was put into use by the French for special military purposes, according to Edwin C. Eckel, a consulting engineer of Washington, D. C., writing in *Engineering-News Record*. The high technical value, in certain limited fields of this cement is such as to make it advisable to briefly discuss its characteristics.

As an introductory summary we may say that it is a lime aluminate, differing from normal portland cement in the almost total absence of silica; that it is prepared by actual fusion, not by mere clinkering; that it is almost white in color; and that it will harden with such rapidity as to make a good heavy-gun platform within 24 hours. It will be seen that it offers certain possibilities for other than military uses; and that products of this general type may become of interest both to American cement manufacturers and to American engineers.

Of course it is well known here that, a decade or more ago, Messrs. Lazell and Spackman began investigating the possibilities of high-alumina cements, and took out a series of patents in connection with them. Some of the processes then developed have come into use, particularly in connection with the lime industry, where it was found that the addition of a lime aluminate aided greatly in giving a more rapid hardening to limes and lime plasters. But so far as is known, none of the products made for that purpose were ever, commercially, real aluminates of lime. They were made in the majority of cases from a furnace slag which carried abnormally high alumina, because it came from furnaces running on brown iron ores from the coast of Cuba.

What is less commonly known, however, is that a parallel series of investigations were being carried on in France, at about the same time, and that these have resulted in an entirely different series of commercial products. The French patents were taken out in 1908 by the well-known firm of J. & A. Pavin de Lafarge, who are among the largest French manufacturers of both portland cement and hydraulic lime. During the war the A. E. F. operated some of the Lafarge plants and while in charge of that work it was possible to observe the manufacture and characteristics of the fused aluminous cement which was being made at a neighboring plant for artillery mounts.

The Lafarge quick-hardening aluminous cement was marketed as *ciment fondu* or fused cement, and for the sake of brevity that term will be used hereafter.

The fused cement is made in a small blast furnace, which is charged with coke, limestone and bauxite. When the furnace is in steady operation it turns out from ten to fifteen metric tons a day of fused slag or clinker. This slag, cooled and ground, is the Lafarge fused cement. In composition it does not vary greatly from

	Per Cent
Lime	50
Alumina	40
Silica, etc.	10

The silica noted comes in chiefly from the impurities of the coke, but in lesser part from the bauxite, and to a very slight extent from the limestone used. The fused cement, as will be seen from the above note, is far lower in lime than the normal portland cements.

So far as cost of manufacture is concerned, the fused cement can obviously be made at least as cheaply as a normal portland. Its uses will be determined then, not by cost, but by its special characteristics, which give it value in certain fields of work, but limit its use in other lines. We may note briefly some of these characteristics.

The fused cement has a normal setting time, falling in this regard within ordinary portland cement specifications. It can therefore be mixed and worked without taking any extraordinary precautions.

Its hardening, however, takes place with far greater rapidity than does that of a normal portland cement, so that a 24-hr. test will give results for the fused cement which are rarely obtainable with portlands under 28 days. In saying this it must be kept in mind that we are speaking of French cements used in French climate. The average American portland, used in the United States, will both set and harden faster than European portland employed abroad.

Laboratory tests on the fused cement gave the following results, the briquettes and cubes being made up of a 1:3 mixture of cement and sand.

Resistance in kilograms per square centimetre:

Age	Tension	Compression
1 day	29 kg.	352 kg.
2 days	34 kg.	387 kg.
3 days	34½ kg.	400 kg.
7 days	35½ kg.	451 kg.
28 days	37½ kg.	475 kg.

Considering the composition of the fused cement, its most remarkable property perhaps is its resistance to the decomposing effects of sea water and similar solutions, for until the Lafarge cement was introduced there was a tendency to ascribe the breaking up of portland cement in sea water to its content of alumina, and to search for cements low in alumina. Yet here we have a cement with a very abnormal alumina content which seems to be perfectly resistant to marine action.

The Paris-Lyons-Mediterranee R. R. used fused cement on a portion of its line along the Mediterranean, where normal cements are badly affected by exposure to sea air and salt water; and the fused cement is reported to have stood the exposure.

In laboratory tests, for which records of nine years' standing are now available, the fused cement has been kept in three solutions: (1) Sea water, (2) water saturated with lime sulphate and (3) water carrying 1.2 per cent magnesium sulphate. The cubes kept for nine years under these three very trying conditions are in every way intact.

Briquets of neat cement, composed of fused cement to which gypsum was added in all proportions up to 50 per cent, have been kept in water since 1908 without the least signs of disintegration.

In view of these facts it seems evident that we must broaden our ideas as to the possible modes of securing protection of cement against the action of sea water and of other strong solutions. No data has been secured regarding the resistance of the fused cement against highly alkaline or acid solutions, a matter which is year after year becoming of greater industrial importance.

To sum up the matter, we are dealing with a cement of entirely new type, which seems to be well worthy the consideration of American engineers and chemists. None of the Lafarge fused cement has ever been shipped into this country; and no cement of that type has, so far as known ever been made here by anyone else. In view of the history of the Spackman and the Lafarge patents, it is questionable as to how far any patent rights can now cover the product above described in the United States. The commercial side of the matter is therefore uncertain; but as a technical affair it is certainly worth more attention than has been given to it heretofore.

Don't Want Uniform Mileage Freight Rates

Sand and Gravel Producers of Central Freight Association Territory Unanimously Against Changing the Present Basis of Rates

LOWER FREIGHT RATES must be had or the sand and gravel industry will soon reorganize to eliminate railway hauls almost entirely. Rates must be lowered in the same manner in which they were raised—by knocking off the percentage and flat increases—not by the substitution of a new scale, and by no means, under any circumstances, a uniform mileage scale.

These are the conclusions of a largely attended conference of Mid-West sand and gravel producers in Chicago on November 9, and these were the conclusions transmitted on the following day to the Central Freight Traffic Committee in frank and unmistakable terms.

The Central Freight Traffic Association is attempting to force on the sand, gravel and crushed-stone industries the same scale of rates recently accepted by the producers and state highway authorities of Indiana. This is the substitution of a 15 per cent advance, in place of the 40 per cent advance of August, 1920, with the provision that no new rates shall be less than the mileage scale now in effect in the lower Michigan peninsular (published in ROCK PRODUCTS, October 22, 1921, p. 38). This is the same proposition that they made in Ohio, and which was turned down. The Ohio Public Service Commission subsequently ordered a reduction amounting to the full 40 per cent added in August, 1920.

While the railway proposition includes an assurance that present rates lower than the Michigan scale will not be increased, the producers are convinced that this move of the railways is nothing more or less than an organized attempt to establish a mileage system of rates, which eventually will be universally applied. The experience of Southern producers, whose case is now pending before the Georgia Railroad Commission, seems to furnish some reason for this belief.

Preliminary Meeting

At the meeting of producers at the La Salle hotel on November 9 President Johnston presided and Executive Secretary Sutton and Traffic Representative Brooker, of the National Association of Sand and Gravel Producers, were present to lend their aid and counsel. There were also present nearly all the members of the executive committee of the National Association.

Secretary Sutton, for the information of the attending producers, gave a brief resume of the freight rate situation and of the progress made in the National's work up to the present time.

The chair related the results of the national officers' visit to Atlanta on October 3, when the Southern Sand and Gravel Producers met to protest against the Southern Railway's proposal to adopt a mileage scale. He said that the National had made a fine start in its fight against excessive and unfair freight rates; that the National was in this battle to the finish; that the carriers were beginning to believe that the producers knew what they wanted and had set out to get it.

A. P. Burke, Atlanta, Ga., chiefly instrumental in calling together the sand and gravel producers from 13 Southern states to the Atlanta meeting, gave the conference a brief, lucid outline of what was done at that meeting. What the railways generally will attempt to do may be reflected later by the attitude of the Southern Railway.

Burton H. Atwood, representing the Illinois producers, laid stress upon the necessity of convincing the carriers that the sand and gravel and crushed-stone industry was equally basic with livestock, grain or other like commodities. He cited an instance where one traffic manager admitted that sand and gravel rates were exorbitant, when it was proved that sand and gravel earned three times the profit over another basic product carried the same distance. Mr. Atwood made an earnest plea that all present consider the "greatest good to the greatest number" and submerge their individual interest to the common good.

John S. Burchmore, traffic attorney for the National Association in the rate case against all the railways now before the Interstate Commerce Commission, discussed this case for the information of those present. He went into the methods to be pursued and explained those points that were obscure to several inquiring members.

Mr. Brooker closed the morning session in an instructive talk on the general policy to be carried out at this conference.

At the opening of the afternoon session President Johnston earnestly urged each and every producer to support this endeavor to secure just and equitable freight rates. "We must get behind and push," he declared. "We are getting under the hide of the traffic manager; he is beginning to see the handwriting on the wall, and we will win if we fight."

Pursuant to the conference held the following day with the Central Freight Association, the following men were selected by the chair to present the case of the Association: Burton H. Atwood, Illinois; Alex. W. Dann, Pennsylvania; J. E. Carroll, New York; Howard Hoel, Ohio; M. A. Neville, Indiana; George J. Bollender, Michigan.

Freight Rate Meeting with Railway Men

On Thursday morning promptly at 10 o'clock, about 50 producers attended the hearing before the Traffic Committee of the Central Freight Association, presided over by Chairman Morris of the traffic committee.

Alex. W. Dann made the opening address on behalf of the sand and gravel men. His sumnation of the situation was masterly—a clear, brief statement of the burden borne by producers under excessive charges, with no relief in sight. Mr. Dann asked the committee why non-competitive commodities should have preferred rates over sand and gravel, a basic commodity easily and profitably handled; why even slag, a competitive product, should have lower rates in many cases than sand and gravel.

Frankly, said he, the producer today, from his experience in traffic hearings, is well nigh convinced that the average traffic manager is ignorant of the amount of additional haulage in sand and gravel that lies at his very doorstep; that hundreds of thousands of tons are being hauled by waterways and by trucks that should properly and profitably be carried by the railways; that traffic managers have held to paper rates with little haulage when by fixing just and lower rates they could have not only held on to a falling business, but could have increased this class of traffic manyfold.

J. E. Carroll, Buffalo, N. Y., stated the case of the producer in his state. His plant supplies thousands of tons to Pennsylvania and could do a largely increased business if the ultimate consumers, the taxpayers, were no longer willing to carry the extra expense made necessary by high freight rates. The rates in New York State, which never were increased the 40 per cent, are making good business for the railways.

Howard Hoel, sales manager of one of the largest producing companies in the

C. F. A. territory, said that it had taken 20 years and hundreds of thousands of dollars to educate the engineers and contractors to using the present high grade of aggregates. Unless, said Mr. Hoel, the traffic managers intend to tear down this industrial structure and set the industry back at least 20 years; close up immense plants and deprive thousands of men of their livelihood, they must revise their present rates.

M. A. Neville, speaking for Indiana interests, gave some significant comparisons of traffic figures showing that what were supposedly reduced rates under the recent Indiana bargain were in reality but paper rates; these rates had compelled many producers to trim down their plants, install portable outfits and haul by trucks or waterway.

Mr. Bollender, speaking for the Michigan producers, said that the Michigan rates, contrary to report, were highly unsatisfactory and that a readjustment downward by order of the Michigan Public Utilities Commission, was a practical certainty. The figures given out by the railroads stated one amount and meant another. The Michigan State Highway Department is still unwilling to bear the ultimate extra expense entailed by exorbitant rates and will assist the producers in getting lower rates.

Burton S. Atwood, spoke for the Illinois producers. He wittily illustrated the traffic managers' attitude about this way: "Sam's wife was eternally demanding money of him, night and day. She finally went to Sam's boss and complained. Sam said: 'Dis woman am havin' me gone distracted erbout money all the time.' 'How much do you give her, Sam?' asked the boss. 'Ah ain't given her any yit,' said Sam. And as far as the traffic manager is concerned, he is in the same boat with Sam, said Mr. Atwood. 'You have given us nothing as yet,' said he, 'but we will have to have better rates if we are to continue in business and meet the demands on our industry.'"

In summing up for the producers, President Johnston said, in substance: "You, the traffic men, and we, the producers, have every reason to co-operate. We want to stay friends—and fight as friends. But, fight we will, gentlemen of this traffic committee, to the last ditch. We have worked with you in building up an immense traffic in sand and gravel. We even act as salesmen of your transportation for you. And your rates are not only an exceeding hardship to us, but, in a year or so, it will have become impossible not only for us to do business, but you will find that the waterways and the trucks have absorbed all your business in sand and gravel traffic."

One of the traffic men ventured the opinion that the arguments were much too general and asked Mr. Johnston what specific rate the producer wanted. He was told that no uniform rate would be fair to either the railroads or to the producer. The producer wanted a rate that would enable both parties to get a fair return, and no more. Today the producer was not getting that rate from any railroad in the country.

Chairman Morris thanked the producers for coming before his committee and said that the case would be discussed immediately by the committee and the producers be informed of their conclusions.

Sand and Gravel Producers Begin I. C. C. Rate Case

File Petitions Asking for General Reduction of Rates in All the Railway Freight Territories

IN ITS FIGHT for justice from the railroads the National Association of Sand and Gravel Producers has filed a petition with the Interstate Commerce Commission seeking a general reduction of rates in all of the railroad territories. John H. Burchmore, nationally known in the industry for his services in similar cases, and Luther M. Walter are the association's attorneys.

This complaint is also filed at the request and for the benefit of numerous persons, firms and corporations producing sand and gravel in the Central States who are not members of the complainant association—in brief, it voices the plaint of all who ship sand and gravel, both in interstate commerce, and intrastate, in and between the several states and who market sand and gravel in the territory not shipped by railroad, but is moved by water or by truck or other conveyance.

These salient points are set forth in the complaint:

The complaining shippers ask the Interstate Commerce Commission to investigate the reasonableness of the present level of freight rates on sand and gravel. A large proportion of this traffic is intrastate, but the present rates were established by order of the Interstate Commerce Commission and the petitioners look to it for redress.

Sand and gravel are basic commodities, but, unlike many other basic commodities, they are found throughout the United States. The larger plants at all times have to meet a large and active competition from roadside or portable plants with materials which do not meet standard specifications, are inferior in quality and less suitable to their intended uses.

But, says the complaint, the use of inferior materials may be compelled by reason of the high *delivered* costs of the prepared products, including high transportation charges now borne by the same. Despite this competitive situation, the established shipping industry has increased in importance in recent years, due in a large measure to the increase in concrete construction and the use of sand and gravel as materials for concrete and hard road building.

The industry has developed from one involving a short movement of sand and gravel by wagon to local territory to an immense industry shipping by railroad. In conjunction with the competitive materials these commodities now contribute an enormous volume of tonnage for railroad transportation.

There must be a large and steady output from the plants to stabilize the industry and keep down the cost of production to a point where those plants which ship by rail are able to supply the demand in competition with local materials, thus maintaining their rated tonnage.

The present freight rates throughout the United States are a menace to the complaining shippers and producers as these rates have increased the use of local materials. The rates of the past year have eliminated many important markets for the railroad shipping plants; have restricted efficient production of materials on standard specifications for material used in highway and concrete work, which is directly opposed to public interest.

A large tonnage has been diverted from the railroads and replaced by materials transported by river or truck. The business has been disorganized and production greatly curtailed and there has been general inactivity in construction work. The complaining shippers are threatened with great financial loss—in many cases with ruin—if the present rates are continued.

From the broad standpoint of public policy, the Interstate Commerce Commission, should take prompt action to reduce these rates to a basis that will bring about the resumption of construction work throughout the country.

Plain and quick remedy would be afforded by encouraging the immediate building of houses, viaducts, bridges and other structures. It would give employment to hundreds of thousands of skilled and unskilled men now out of work dur-

ing the readjustment period, and stimulate business generally. The complainants insist the present rates published, maintained and charged by the defendants individually and jointly for each and every movement of sand and gravel, from each shipping point on the lines of any and all defendants in all of the states named in Paragraphs I and III therefore every destination reached by any and all defendants in all of said states are:

a Unjust and unreasonable in violation of Section 1 of the Interstate Commerce Act;

b Unduly prejudicial and preferential as compared with rates on other commodities in the same territory in violation of Section 3 of said Act; and

c In violation of Section 15a of said Act in that the said rates instead of producing the maximum revenue on said traffic which is essential in order that defendants may earn, in the aggregate and individually, the rate of return contemplated by Section 15a, are now so adjusted that they curtail the traffic, drive tonnage away from defendants and the aggregate revenues are thus unduly and unnecessarily diminished.

d And it is further respectfully averred that in instances entirely too numerous to be described with any accuracy, the defendants charge much lower rates on slag prepared for use in concrete work and which competes with gravel than they charge under similar circumstances and conditions in the same section for the transportation for sand and gravel; and the said higher basis of rates on sand and gravel and lower basis on slag constitutes an unjust discrimination and undue preference and advantage against complainants as shippers of sand and gravel, against their shipping points, and against their shipments in violation of Section 3 of the Interstate Commerce Act.

Provisions in the tariffs defining the minimum weight governing carload shipments are in a great many instances unjust and unreasonable and in violation of section 3—the said minimums are excessive and the regulations so drawn that it is impossible for shippers in loading the cars to avoid penalties for overloading without incurring penalties for failure to load the required weight. The purpose is to procure reasonable regulations defining the minimum weights governing the rates involved.

The complainants charge no violation of the Interstate Commerce Act by reason of any conflict between intrastate and interstate rates; on the contrary, the intrastate rates are by virtue of Ex Parte 74 unreasonable and excessive and in violation of the Interstate Commerce and Transportation Acts as set forth in section 10.

As the state authorities have a real and substantial interest in this complaint, it is suggested that this petition be served by the commission upon the Railroad or Public Service Commission of each of the states referred to for their information and for such action as they may consider appropriate.

The commission is further asked to serve this complaint upon each of the defendants and ask their answers thereto; that the matter be given a hearing as promptly as possible; that the commission will then issue its order requiring the defendants collectively and individually to desist from the aforesaid violations and prescribe reasonable rates and rate bases for the transportation of sand and gravel; that the commission will set aside or modify the orders known as Ex Parte 74 and related cases insofar as the same require increases on sand and gravel, interstate and intrastate; that the commission will enter such other or further orders and take such steps as may be found necessary or reasonable in the premises.

Magnesite From Dolomite

By Djevad Eyoub, Brooklyn, N. Y.

Successful Commercial Process Can Perhaps Be Developed

NON-METALLIC PRODUCTS are often regarded by ordinary laymen as of trivial consequence. They know, of course, the value of gold, silver and copper, chiefly perhaps, through some stocks they own in one or another mine. They can visualize the wealth when gold or silver is produced. But non-metallics, like stepchildren, are rarely seriously thought of. And yet the study of the United States Geological Survey reports shows the following figures for 1916 and 1917, years most auspicious for metallic products:

	1916	1917
Non-metallic products	$1,878,463,000	$2,888,923,000
Metallic products	1,620,508,000	2,091,824,000

More recent statistics indicate a greater discrepancy in favor of non-metallics since copper and other metallic industries have been practically at a standstill.

Therefore, we do not need to apologize for the work done or to be done for the artificial production of one of the non-metallic members, namely, magnesite.

Previous to the great war United States imported almost all of the magnesite used in this country. During 1913 there was imported into United States 149,000 tons of magnesite from Austria and Greece. Of course, the advent of the war closed this channel. Magnesite prior to war sold at $20-$25 per ton calcined and at the Atlantic seaboard. During 1916, $65-$70 was quoted firmly for burnt magnesite in New York and Philadelphia. These high prices gave a sudden impetus to magnesite mining in California and brought about the successful prospecting and production of it in Washington. Simultaneously it interested several of the New York financiers in a research to see if magnesite could not, successfully and economically, be extracted from dolomite in which rock the vicinity of New York and Philadelphia abounds. Formulae for magnesite being ($MgCO_3$) and for dolomite ($MgCO_3$, $CaCO_3$) it will be noted that the problem is the elimination of lime.

During the latter part of 1917 the writer was engaged in this problem. The research work thus undertaken lasted nearly eight months, and the attempt, only a partial success at the time, was abandoned for more propitious times. Meanwhile the western products began to arrive in remarkable quantities. Before the war California produced about 10,000 tons per annum and Washington was not in the market at all. In 1917 California's production reached 200,000 mark, while that of Washington was over 100,000 tons.

It appears that most of the magnesite used in the country is used in the East. It is there that gigantic steel plants, large paper mills, growing flooring industry are located. Yet the magnesite used comes from California, Washington, and in spite of the tariff some from Europe. But the price for either domestic or foreign product is still around $60 per ton calcined.

The object of the present article is more in the nature of exhorting the Atlantic States to use their limitless quanties of dolomite rather than give a detailed description of the methods I have used in the course of my investigations. Suffice it to say that out of ten experiments conducted six gave the following average:

MgO	81.20%
CaO	4.10%
Insolubles	13.90%

Comparing these with the products marketed:

	European	Northwestern
MgO	85.12%	83.04%
CaO	2.90%	3.11%
Insolubles	11.50%	13.80%

We note how nearly successful the attempt was. It might be stated in this connection that lime in excess of 3% is detrimental in flooring work, though 4% might be used in refractories.

The California product has to overcome transportation charges of $16 per ton in Eastern markets. Besides, some manner of sorting is necessary in mining the magnesite, while no special precaution need be taken in dolomite quarrying. Also, the labor in the East is cheaper. This will show lower costs in mining and calcining. Against these, however, there is the item of handling twice as much material and the expense of a process that might be adopted. It is the writer's belief that these are more than made up by the transportation charges from the West and that such an artificial magnesite produced in the East will eventually successfully compete both with the European and Western magnesite. Because it is in the East, where the market lies.

United States Court Decision on Open-Price Associations

Far-Reaching Ruling of Judge Carpenter in Famous Linseed Oil Case—Stabilizing Effect on Business is Desirable—A Real Classic on Modern Business Methods

FOLLOWING IS THE COMPLETE TEXT of the decision of Judge Carpenter of the District Court of the United States for the Northern District of Illinois, in the case of the United States vs. the American Linseed Co., et al., rendered November 1, 1921:

In this case the United States, pursuant to the powers and duties imposed upon it by the Sherman anti-trust act, challenged as a combination or conspiracy a contract between the defendants, linseed oil crushers, and the Armstrong bureau.

The defendant, Julian Armstrong, in October, 1918, organized the Linseed Oil Council and operated it as a member of the Armstrong bureau. The purpose of the council and bureau was to collect and furnish to the various members current quotations on linseed oil, the record of sales of oil, including prices, statistics as to stocks on hand, crop conditions at home and abroad, and other information of interest or value to the manufacturers of linseed oil. The Armstrong bureau entered into contracts with certain of the defendants and agreed to furnish them the foregoing information for a consideration.

Pursuant to these contracts the various subscribers daily reported their price lists to the bureau, and promptly sent word of any change. Other information was also furnished from time to time. The statements received and collected by the bureau were immediately sent out to all the members of the association.

True Information Distributed

The record discloses that the information collected and distributed by the bureau to its several members was of the kind which a sagacious business man secures, or endeavors to secure, in the operation of his enterprise. The information was true. The price lists furnished were made in the regular course of business, and offered in good faith to customers or prospective customers. There was no proof that the members of the association ever, at the bureau meetings or at any other place, discussed prices or made agreements with respect to prices, and there was no evidence that the prices asked by any of the subscribers were not in accordance with the market price of flaxseed, upon which the price of linseed oil was based.

Production was not limited during the period the bureau was in operation. There was no proof of division of territory. There was no proof that the prices asked by the individual defendants were not fixed by them upon their own judgment, considering all factors affecting supply and demand. There was no proof showing that any member was under the slightest obligation or constraint to ask higher prices or maintain prices.

Uniformity of Price

The main argument for the United States is that the operation of the bureau tended toward a stabilization or uniformity of price on any given day, which was not due to competition, in accordance with economic law.

Many tables of statistics were offered in evidence and read to the court, from which there appeared at times a striking similarity in price, and that changes in prices were made by substantially all the members co-incidentally.

It appears further that the price of linseed oil is controlled by the price of flaxseed, and that the flaxseed market is an open one in which there are wide fluctuations as well as inactive periods.

The government has not shown that there was artificial regulation of price, either by definite oral or written agreement or by tacit understanding.

Each individual crusher entering into a contract with the Armstrong bureau specifically and expressly agreed that all information reported to the bureau or distributed by it should at all times be purely statistical and pertain only to past operations, and that the bureau should not be used to enable the constituent members to fix prices for the sale of linseed oil, cake or meal; to limit the sale, production or manufacture thereof, or to divide the territory in which it was to be sold.

It is incumbent upon the government to show by the clear preponderance of the evidence that the defendants conspired to restrain interstate commerce. In the absence of direct proof of actual entering into of such a combination, and in the face of the denial under oath of the defendants that any such conspiracy or combination was entered into or made, the government must show that what the defendants did necessarily had the result of restraining trade, or, if it relies upon the circumstantial evidence to show that a conspiracy was actually entered into, it must show to the satisfaction of the court that the circumstances upon which reliance is placed are entirely inconsistent with supposition of innocence.

The Open Price Plan

The question involved is whether an association, such as the Armstrong agency (sometimes called the open price plan) is obnoxious to the anti-trust laws, whether or not there is anything inherently wrong in an agreement between producers in a certain line to furnish each other their prices and not to make any sale deviating from the price-list without immediately notifying all the others.

Associations of merchants and manufacturers, boards of trade and exchanges are of great antiquity. Evidently such associations were not aimed at by the Sherman act, because they are not mentioned in the act. A distinction is sought to be drawn between the operations of an exchange and what was done by the defendants through the Armstrong bureau. An exchange sends out reports of actual sales. The Armstrong bureau gave out price lists. It is difficult to understand any ground for declaring one legal and the other illegal. Every producer or merchant desires to obtain for his goods the highest price he can get. The price which he charges is always the highest which he believes the traffic will bear. He cannot charge, ordinarily, more than his competitors. His competitors' price fixes the point above which he cannot go. When the merchant fixes the price at the level of his competitors he is fixing it in competition with his rival just as much as though he had named a lower price. The competition of his rival has prevented him from charging a higher price. If, on the other hand, he finds that he cannot move his goods at the price fixed by his competitors he will naturally lower the price and this will establish a new level. This is the essence of what constitutes competition.

Quotations established by the sales on an exchange establish the market value at the time of the sale, but not the market value the day after. The prices at which goods are offered for sale at any moment establish the market value at that moment.

In those lines of merchandising where there are no exchanges, the prices which producers and dealers put upon their goods constitute the market price. (Cliquot's Champagne, 3 Wall. 114.) In the trial of that case the judge charged the jury as follows:

"The market value of goods is the price at which the owner of the goods, or the producer, holds them for sale; the price at which they are freely offered in the market to all the world; such prices as dealers in the goods are willing to receive, and purchasers are made to pay, when the goods are bought and sold in the ordinary course of trade."

This charge was approved by the Supreme Court.

The above language was cited and approved by the Supreme Court in Muser vs. Magone, 155 U. S. 240, at page 249.

Necessity for Price Information

If it is lawful for dealers to get together in an exchange and provide for a dissemination of the prices obtained on

actual sales, why should it be unlawful for those producers and dealers in lines where no public exchange has been established, to make some provision for disseminating information of market value or prices? To put it in another way, why should they be limited to the dissemination of the market prices of yesterday, but not those of today?

In order to obtain efficiency in business, as well as in any other human activity, it is necessary to have reliable, immediate and adequate records. With the progress that has been made in the last centurity it is not to be expected that business alone stood still.

In the old days when at noon the busiman of the community met in the village blacksmith shop, or in the evening met at the corner grocery, a man was supposed to carry in his head all the facts in regard to his business and never to disclose them to a competitor. Adequate systems of accounting had not been devised. Overhead as a cost element in operation was unheard of. Business was run by the rule of thumb. Such days have gone by. The commercial enterprise today which is not so managed that its head can at any time know how large is his stock, the volume of his sales, the cost of his operation and the amount of his profit and loss sooner or later will be distanced by his competitors.

It is because business is so much more complex, the volume so much greater, the margin of profit on single transactions so much less that the merchants of today must have at instant command reliable and adequate information immediately to be secured and more or less permanent in form. Business is no longer a game of chance, but a matter of scientific calculation.

The First Step in Competition

A merchant cannot compete with another merchant unless he knows what he must compete against. A knowledge of what his competitor is charging is the first step in competition. It does not follow because one man knows the price which his competitor is asking, and he then fixes the same price, that this action is by agreement. If his competitor charges a high price he naturally will ask the same price if he thinks he can get it. It is absurd to imagine that every merchant does not endeavor to keep posted on the prices asked by his competitor. If he fails to keep posted he will find himself losing money. If his prices are too high his customers leave him. If too low, he fails to reap the profit to which he is entitled. The government cannot seriously contend that it is the duty of every merchant to guard against his competitor, finding out what he is charging. It would be an impossibility. Nor is it wrong for a merchant to endeavor to find out what his rivals are charging. If he cannot get it directly and easily, he will necessarily get it indirectly and at a great expense and slowly. He must know in order to conduct his business properly; nor does the public profit by the mistakes of a merchant charging too much on the one hand or too little on the other, for want of such information. The mistakes would in all probability fall equally on either side.

Quick and accurate information of what his competitors are charging naturally leads to uniformity in prices. But because one merchant charges the same price that the other merchant charges because he finds that he can get it does not necessarily indicate that there is any agreement between them to charge the same price. As the Supreme Court said, in the Steel Case, a uniformity in price does not prove a conspiracy.

What applies to sales for present delivery applies equally to sales for future delivery.

Relation Between Prices of Raw Materials and Finished Products

Much has been made by counsel for the government of the fact that prices of oil went up along with the price of flaxseed; that afterwards when flaxseed declined sharply, the price of oil did not come down at the same rate, but declined at a much slower pace. The court will take judicial knowledge that for the past several months a decline in prices has been going on. The government has failed to show that the phenomenon of the price of oil declining at a slower rate than the price of flaxseed was not common in other lines, where the price of the raw materials has fallen. That the price of the finished product on a declining market will fall at a slower rate than the price of the raw material is natural, and therefore expected. The price of the finished material under conceded economic rules in the market where there is competition will depend upon the supply and demand of the finished material. The drop in the price of the raw material does not affect the supply of the finished material. Time must elapse before the supply of finished material is increased by the low prices of raw material, and until a supply of finished material is increased, assuming that the demand remains constant, no decline in price may be expected. When the price of raw material starts to go up, less of the finished material will be produced, and stoppage or slowing up of the manufacture of the finished material will be at once reflected in an increased price.

The court should not construe the acts of the defendants to be illegal when it can, with equal facility, ascribe them to an innocent intention.

Stabilized Market

But it is charged by the government that the defendants themselves claim that the effect of the bureau was to stabilize prices. That is to say, as a result of accurate and instant knowledge on the part of producers, the price of linseed oil instead of varying sharply from day to day, as shown by the sales made, assumed an average price without the deviations. If these deviations before had been the result of real competition, based on accurate knowledge by the producers of the real market conditions, then the government is far from sustaining its contentions. The defendants, however, have shown, and their evidence is uncontradicted, that the deviations before existing were caused by the individual producers endeavoring to meet prices of their competitors which had never been made; and it is common in the trade for buyers to make false representations as to the prices made by other producers. Surely, such a condition is not the one that the Sherman act aims to foster.

The government was greatly disturbed by a statement in the defendant Ferry's books that the Armstrong bureau brought about a stabilized market. This expression seems to have been a great bugaboo. Counsel for plaintiff would have the court believe that the term "stabilized market" means nothing other than uniform prices. Whatever the proper definition of the phrase, the record does not show that there was a stabilization or uniformity in prices.

The defendants contend, and I agree, that the term "stabilized market" means the obtaining and distributing of any accurate information that would enable crushers consequently enriched, is not better to understand the conditions of the flaxseed and oil market, to the end that the speculative hazards which formerly had worked injury to both seller and buyer would be minimized and eventually eliminated, and the economic law of supply and demand be more intelligently put into operation.

The Zone System

Complaint is made against what is called the "zone system" and differentials applying thereto. It is true the prices quoted had reference to certain well defined territory, and the prices were accompanied by differentials to equalize the cost of railroad transportation. The record shows that these differentials were adopted after a thorough and intelligent investigation of freight rates from the base point to point of delivery, and the addition to the price, ranging from 2 to 27 cents per gallon on spot, and from 1 to 50 cents on futures in the different zones was arrived at after a fair averaging of those freight rates into the designated territory.

Zoning for the purpose of fixing rates is not new. The Interstate Commerce Commission permits it in regulating the charges to be made by railroads. It is not a perfect system and there is always a certain amount of discrimination to those who live on or near the dividing line between zones, and I have no doubt a few buyers of oil may have been to some extent penalized, but every buyer had the option of purchasing f.o.b. point of manufacture, or f.o.b. point of delivery, and I must assume that the buyer would choose that f.o.b. point which seemed the most to his advantage.

The charge of the government that the zone differentials were adopted in order that the price charged for oil would be artificially enhanced and the defendant crushers consequently enriched is not borne out by the evidence. There was no zone in which all the crushers did business, and the bulk of the finished product sold by the defendants was for delivery in zones carrying minimum freight differentials.

Real Competition

Counsel for the government seeks to draw an inference of guilt from the admission of defendants that the bureau allowed them to sleep nights. The only restraint which the rules of the bureau on their face impose is that the members agree not to deviate from their price lists without informing the other members at once by telegraph. At the close of each business day every member knew until the next day what the market was. It seems to me that the situation thus created is not dissimilar from that sustained by the United States Supreme Court in Chicago Board of Trade vs. United States, 246 U. S. 231. It is very evident that the Supreme Court does not believe that the Sherman act should prevent men from sleeping nights.

The Armstrong bureau was organized

solely for the purpose of furnishing information not only to the linseed oil crushers, but to those interested in every other industry. It was a bureau of intelligence, and one which makes for real rather than artificial competition in trade. There was no restriction placed upon any member. He was free to buy from and sell to whomever he chose. The bureau operated solely as to past transactions, and wherever there is freedom of contract on the part of the constituent members there cannot be a violation fo the Sherman act.

Legality of Association Activities

The prosecution, down deep, evidently believes that an association of producers or merchants must necessarily be obnoxious to the Sherman act because it affords an opportunity for the members to conspire to restrain trade.

Where there is such an association it is perfectly natural for members to express themselves as to conditions and prices; in fact, that is what the association is formed for, and these expressions have been seized upon by counsel as evidence to show that a corrupt agreement was actually made.

To my mind some of these expressions are evidence that no such agreement was in fact made, if they are evidence of anything. It would be perfectly natural, among a meeting of oil men, for some one to say that he thought prices ought to be higher. The meaning conveyed by such an expression would be that the man was at a loss to understand why prices were not higher, taking into consideration the demand and supply and conditions of the trade. I might well say today that the weather ought to be cooler without laying myself open to the imputation that the temperature had been fixed by an agreement of mine.

Logic which assumes that because there is an opportunity to fix prices, therefore prices are fixed, is contrary to the genius and theory of our law. Every man is presumed to be innocent until he is proved to be guilty. If the Armstrong bureau is to be dissolved merely because it afforded an opportunity for the members to fix prices, then this court, with equal propriety, could be asked to dissolve any lunch club where business men met. This theory hardly warrants discussion, and I would not mention it had I not been gravely urged in this case, that such was the underlying thought of the prosecution. It is the ancient *fallax post hoc propter hoc.*

The bill will be dismissed for want of equity.

No Freight Reduction in Youngstown District

NO REDUCTION in freight rates on iron ore, limestone and dolomite will be made by the railroads at this time, as requested by iron and steel interests of Pittsburgh and Youngstown. The industries asked for a reduction of 25 per cent. A conference on the subject was held recently in New York by representatives of the railroads and various large steel companies. Industrial representatives believe the reduction was deferred in view of a possible revision of freight charges early next year.

Lime-Plaster Failures Explained

Bureau of Standards' Tests Show Premature Painting Sealed the Surface Against Carbon Dioxide Necessary to Complete the Hardening Process

RUMORS HAVE BEEN RIFE in the building industry for many weeks concerning the alleged failure of lime plaster in a very important Cleveland job. Such rumors invariably do much more harm than full publicity. So let's now turn the light of publicity on these failures from two absolutely unbiased sources. What follows is from the November 12 issue of the weekly bulletin of the Associated General Contractors of America:

"The series of plaster failures in Cleveland, Ohio, which, during the past six months, have become a perplexing problem for contractors, are shown conclusively by investigation and analysis by the Bureau of Standards to have resulted through no fault of the contractors. At the request of the A. G. C., samples from the Mt. Sinai hospital, the most prominent case of failure, were tested by the bureau, which after careful study of attending conditions, workmanship and materials gave out the accompanying report:

"Since, as shown by the report, failure was due to no lack of care or skill in executing the plaster work, but resulted from subsequent chemical action of the lime (a brand accepted by the architects), a question is involved as to whether the product was faulty. This chemical action took place because the plaster surface was prematurely painted, but the final responsibility appears to depend upon whether the product was sold with an understanding that it could be painted within a given time. Five months was about the average time elapsing between plastering and painting. If it was understood that painting was permissible within five months, or if such time is that commonly accepted, then the lime may reasonably be designated faulty. On the other hand, if no such understanding existed and the architects used their own discretion in regard to painting, responsibility may reasonably be attributed to their supervision. In either event the contractors are not to blame.

Bureau of Standards Report

"1. The information contained in your letters of November 2 and 5 enables us to form an opinion as to the cause of the failure of plaster on the Mt. Sinai hospital in Cleveland. This opinion must be regarded as tentative, however, pending completion of the examination of the plaster in our laboratory.

"2. The type of hydrated lime used on this building is a kind which is generally recognized as being excellent for plastering purposes. It contains a large percentage of magnesium oxide. Under ordinary circumstances this magnesia is not harmful. Either it is attacked directly by the carbon dioxide of the air being converted into magnesium carbonate, or if it is attacked by water first, the magnesium hydroxide is quickly converted into carbonate, so that under ordinary circumstances there is little or no magnesium hydroxide to be found in plaster. The rapidity with which magnesium oxide undergoes chemical change depends primarily upon the temperature at which it was burned in the lime kiln. Usually the reaction is pretty well completed in about a year.

"3. The change from magnesium oxide to magnesium carbonate is not accompanied by any noticeable effect upon the volume of the plaster. The change from magnesium oxide to hydroxide, however, is accompanied by a very decided expansion. If the plaster on the Mt. Sinai hospital had not been painted it is probable that the magnesium oxide would have been converted into carbonate in the usual way and no trouble would have occurred. The paint was applied before this carbonation had been completed and thus some free magnesium oxide was sealed in the plaster. This combined with water, which was either present in the plaster or wall at the time the paint was applied, or which came in through the walls afterwards. The resultant formation hydroxide would account for the noted expansion, bulging and loosening of the plaster. The fact that no failure occurred where this plaster was applied to metal lath indicates that under these circumstances the back of the plaster provided an inlet for carbon dioxide and an outlet for the water. If this explanation is correct we would expect to find the plaster to contain a noticeable proportion of magnesium hydroxide.

"4. We will communicate with you further on this subject when our laboratory tests have been completed. Inasmuch as this type of lime is of recognized excellence, we do not feel that any blame should be placed upon it. Further trouble can be avoided, if you insist upon the carrying out of the general rule that no plaster shall be painted until after it is a year old. This will give the magnesia plenty of time to carbonate and the wall to dry out, and under these conditions the paint may be applied without danger."

Respectfully,

S. W. STRATTON, Director.

Book Reviews

WITH this issue of ROCK PRODUCTS *the editors introduce a new department, which they hope will grow. It will not appear regularly, because, unfortunately, the literature of rock products is so scanty that it is not expected books for review will be numerous.*

Outside of the portland cement industry very little of our knowledge of rock products preparation has ever been committed to book form. A great deal of valuable printed matter exists in the form of state and national geological survey reports, etc. These also will be reviewed from time to time as they appear.

It is hoped that this department of Rock Products will eventually become a clearing house of rock products literature of all kinds.—The Editors.

SILICA AND THE SILICATES—By James A. Audley, B. Sc. Lond., F. I. C., ceramic chemist. Published by D. Van Nostrand Co., 8 Warren St., New York City. Size 8¾x5¾ in., 388 pp. Price $4.50.

THE CONTENTS of this book are more comprehensive than its title indicates, for silica enters into nearly every product and process in the rock products industries, and all of these are treated more or less in detail.

There are six sections to the book with headings as follows: Silica—varieties, etc.; silicates—natural and artificial varieties; lime, cement and mortar; ceramic industries; glass and enamels; miscellaneous applications of silicates.

Silica is the most abundant mineral in nature. It forms about 60 per cent of the earth's crust. Consequently no quarry or pit is ever opened without encountering silica in some form. It is used in its raw state, as sand, for a variety of purposes well known to our readers. In a chemically combined state we meet with it in all kinds of mineral cements and mortars.

The study of the chemistry of silica and silicates was not undertaken until the science of chemistry as a whole was fairly well developed and elaborated. The result has been to make the study of silica and silicates unduly complicated. No chemist yet has been able to unravel the chemistry of portland cement, either to his own satisfaction or that of other chemists.

The treatise before us certainly handles this problem with much simplicity and accuracy. All said and done, it is surprising how little really accurate knowledge exists in regard to such simple and every day processes as burning a silicious limestone to lime.

TEXT BOOK OF GEOLOGY—By Amadeus W. Grabau, professor of palaeontology in the Government University of Pekin, China. Published by D. C. Heath & Co., Boston, Mass. Size 8¾x5¾ in., in two volumes, 864 pp. and 976 pp. Price $6 per volume.

NO INTELLIGENT man can scratch holes, like quarries, in the earth's crust without becoming somewhat interested in geology. He has a splendid chance to study it in the field and sometimes, very occasionally perhaps, he has an inclination to study it in books.

The books under consideration are very interestingly written. Volume 1 deals with general geology, and covers a discussion of the material of the earth's crust, rocks and their classifications, how the earth's crust was broken up into various deposits and the formation of the later rocks, etc. This volume would naturally be of the most interest to rock products producers inclined in a literary direction.

The second volume treats of historical geology and therefore deals chiefly with palaeontology, or with the animal and vegetable life that went with various stages of the earth's history, and consequently with the methods by which various geological formations are identified.

Both volumes abound with illustrations gathered from all quarters of the globe.

WASTE IN INDUSTRY—By the Committee on Elimination of Waste in Industry of the Federated American Engineering Societies. Published by the Federated Societies McGraw-Hill Book Co., 370 Seventh Ave., New York City, sole selling agents. Size 6x9 in., pp. 409. Price $4.00.

IT IS HARD to see how a live business executive in any line of industry can afford to do without this volume. While none of it deals specifically with any of the rock products industries, of course the fundamentals incidentally covered apply to all business administration.

The building industry is adequately discussed in a 40-page chapter by Sanford E. Thompson, the well known consulting engineer of Boston, Mass. It is one of the least efficiently conducted of all industries, and in this waste the producers of building material of course share in some degree.

The committee which is responsible for this book was appointed just a year ago by Herbert Hoover, Secretary of Commerce, in his capacity at that time as president of the Federated American Engineering Societies. Studies of bituminous coal mining and transportation are in progress and will be published in another volume.

This book, or report, represents the first organized effort to put "pep" into all lines of American business in preparation of the foreign competition our industries must face in the near future. Naturally live business executives in all lines will want to get in on the ground floor, and with such a master mind as Mr. Hoover for director, American business bids fair to enter soon its greatest period of prosperity.

Topeka Mixed Bituminous Pavement Specifications

AS A RESULT of requests for copies of specifications for laying mixed asphaltic (Topeka) roads sent to state highway departments and city engineers, 46 specifications have been received by the Western Laboratories at Lincoln, Neb.

There is a wide variation in many of the features of these specifications, and while the engineering journals have published discussion of such features as grading requirements, variations in temperature clauses, composition of mixture, roller weights, etc., ROCK PRODUCTS will deal only with the subject of "large aggregate" as coming more nearly within the direct scope of its readers.

More than half—54 per cent, to be exact—of these 46 specifications describe large aggregate as "a hard, tough and durable stone"—as a material satisfactory "to the engineer;" 72 per cent has a clause requiring the material to be clean; 20 per cent demanded a certain toughness; 39 per cent a certain minimum French co-efficient of wear; 19 per cent, a certain grading on only two screens; 9 per cent, a grading more than two screens.

It is undoubtedly desirable that this material shall have a "cleanliness" clause. As there are accurate methods for determining the suitability of stone, there should be given limits for toughness and resistance to abrasion; then the instructions are more specific. But the limiting requirements for the several types of mixtures should be different. For instance, where the Topeka specifications are modified by introducing more stone in the mixture than is permissible under the Topeka decree. The properties of the local materials should also be kept in mind so that the best local materials may be used, and, at the same time, make it possible to secure materials economically that will meet all the requirements.

Exact grading of the large aggregate need not be given if limits of composition are specified for the finished mixture.

Editorial Comment

Lime in Breadmaking

Ben L. Schultz, president of the Crystaline Lime Co., Lewiston, Idaho, writes: "Whenever we bake bread, and this is done weekly, the cook puts a teaspoonful of hydrated lime into the batch of dough, and this we find keeps the bread much sweeter and seemingly, at least, makes it lighter. The bread does not dry out as rapidly as when it contains no lime."

We don't know how large Mr. Schultz's family is, so we don't know just how much dough there is. To be liberal we will say enough for four loaves of bread. A teaspoonful of hydrated lime weighs about ½ oz. About 30,000,000 loaves of bread are consumed daily in the United States. An ounce of lime for every eight loaves is approximately 4,000,000 ounces = 125,000 lbs. = 62 tons. A daily consumption of 62 tons a day is about 20,000 tons a year—enough to keep a lime plant busy.

Half a Loaf Not Accepted

It is not very frequently that shippers of a commodity unanimously unite to protest any kind of a reduction in freight rates. It takes nerve and far-sighted business sagacity, and these things are hard to develop with unanimity in any large group of business men. Consequently the action of the mid-west group of the National Association of Sand and Gravel Producers in protesting a proposed reduction of rates is not only high proof of their intelligence as business men, but the finest compliment that could be paid to their leaders.

If it was the aim of the railways to palm off a half a loaf and get some public acknowledgment of their liberality, that would help stave off further reductions, they were sadly disappointed. If it was their aim to create dissension in the ranks of producers by the proffer of a mileage scale, they were equally disappointed. If they hoped to hoodwink the producers into accepting a paper rate reduction in lieu of a real one, they found the producers far better posted in sand and gravel traffic knowledge than themselves.

From the point of view of some producers, doubtless, little was to be gained by meeting the railway traffic officials after the changes in rates had been published and all the machinery set in motion to make them effective. On the other hand, the dealers of the industry saw in this conference one of a series of lectures for railway men on some points of their business, about which they seem notoriously ignorant. It was driving home point after point the relationship of the sand and gravel business to the railways—points that must in time penetrate even the skull of a railway man.

The sum and substance of the conclusions reached at this conference of sand and gravel producers was that if the railways want the business of hauling sand and gravel they must go out and make rates to meet local conditions—they must return to the old system of rate-making. No uniform basis of rates can be successfully applied to this industry, without entailing the loss of a large amount of capital already invested in it.

Open-Price Associations

Every producer of rock products is urged to read the full text of Judge Carpenter's decision in the linseed oil case, printed elsewhere in this issue. He will be interested, not only as a possible member of such an association, but because the judge has given a brief, clean-cut outline of the knowledge a present-day producer of any basic commodity must actually have, if he is to do business efficiently and successfully.

The decision does not mean that an association or group of producers is licensed to fix prices, restrict production, or do other things which their own consciences tell them is wrong and dishonorable, even if the law did not forbid it. It means that the exchange of information in regard to prices and production is recognized as a modern business necessity.

It will be unfortunate if any group of men use this decision as an excuse to do things which will bring discredit on the legitimate operations of an open-price association. Its field for doing good both for the industries and the general public is far broader and larger than its opportunity for evil practices, and it would be disastrous if the "bad actors" should bring about further legal restrictions on the others.

New Plaster Competitor

Few producers in the rock products industry have kept posted on the very remarkable progress made in calcined magnesite cements. Magnesite is the carbonate of magnesium and is closely allied to limestone which is the carbonate of calcium. The two are found in nearly equal proportions in the rock dolomite.

Calcined magnesite, finely ground and mixed with a water solution of magnesium chloride and aggregate, makes an oxy-chloride-cement mortar or concrete which is now commonly used for exterior stucco. However, this material is claimed to be equally good for interior plaster, and it is claimed can be made into building tile that are 50 per cent lighter in weight than gypsum.

The production of magnesite in this country has increased 3000 per cent since 1914. Few building materials present greater possibilities. The trouble is that all present known deposits of magnesite in this country are in California and Washington, which are a long way from the localities where the bulk of the material is used. The possibility of separating the lime and magnesite in dolomite lime is therefore a live problem.

Accident Prevention

Fire Causes and Prevention

No. 2. — Prepared by the Engineering Department of the National Safety Council

Engine Room — Steam pipes should never be in contact with woodwork. The heat from such pipes is apt to ignite the wood. Fires often result when waste or rags are left lying on hot portions of power house machinery. A special place should be provided for keeping such material; a table for oil cans and tools and a suitable container with elevated legs and a spring cover for waste. Lint and waste may accumulate in fly-wheel pits and ignite spontaneously or possibly from a lighted match or cigaret stump thrown into the pit. There should be means for cleaning flywheel pits so that refuse will not accumulate in them.

Gas Engines—The National Board of Fire Underwriters has issued complete rules for the construction and installation of gasoline, kerosene, and gas engines, and these should be consulted where such apparatus is used. Care should be taken that the exhaust pipe from each engine is muffled and that no wood or combustible material is near the exhaust. Where exhaust pipe passes through a combustible partition, the woodwork must be protected. This may be done by providing a double thimble made of two concentric rings of sheet metal with at least one inch air space between and with outer ring covered with asbestos, or else a casing of solid masonry. Ventilation through the opening is essential.

Power Transmission (Mechanical)

Shafting—The principal hazard from power transmission is that of overheated shaft bearings; serious fires have frequently resulted from this cause. All shaft lines should be carefully installed and maintained in a good condition. Shafting out of line quickly causes overheated bearings. There is danger also when any material becomes wound about the shaft, as it may rub against adjacent parts of structure. The hangers and bearings should preferably not be near woodwork. Roller or ball bearings are desirable, but where these are not used self-oiling bearings are recommended. Frequent inspection should be provided beneath all bearings, and these should be emptied frequently to prevent oil dripping on the floor or inflammable material below.

Belts—Probably the next most important cause of fire in the transmission of power is that of belts rubbing against woodwork. Wherever belts pass through wooden floors, walls or partitions, ample clearance should be provided so that the belt will not rub against the woodwork. It is well to limit the play of belt by some form of metal roller. Metal belt shifters are recommended instead of wooden ones; if wood is used that portion of shifter which comes in contact with the belt should be protected by metal.

Static Electricity—Static electricity is the result of friction caused by the rubbing of the belt against pulleys. To remove the static electricity from moving parts three methods have been used with satisfaction:

(a) A glycerine belt dressing.
(b) Grounding of hangers and shafting.
(c) Use of copper comb collector and grounding.

In locations where inflammable vapors or dusts are present and static electricity would create a considerable fire hazard, it is advisable not to install belt drives at all. Drives by shafting through partitions or direct motor drive properly enclosed are preferable.

Electricity—Electric arcs and overheating of electric equipment are the causes of many electric fires. The principal causes of electric arcs are switches with poor contact points, switches exposed to metal contact or to a ground, poor contact in splices and connections, worn insulation, moisture, crossed wires, etc.

Switches—Switch points should not be ragged and loose, but should provide a smooth tight contact. Enclosed switches only are recommended for use, both because of the danger of arcing and because the enclosing case prevents accidental contact of objects, or an operator, with live parts.

Circuits — Improperly made joints (splices) in electrical circuits are a common cause of fires. Joints should be soldered and taped so as to provide a permanent, secure contact between the wires for the passing of current. It is advisable, also, where feasible, that electric circuits be installed in conduit for protection against mechanical injury, and from moisture and fumes.

Temporary Wiring—Frequently temporary wiring is put up to be used for a short time and this is sometimes permitted to remain for permanent use. Temporary wiring should be installed in a safe manner and should not be allowed to become permanent. Dead wiring should be removed because of the possibility of its being connected up after a period of disuse when it is likely to have deteriorated.

Overheating—The principal cause of overheating of electrical equipment is overloading. Fuses and circuit breakers are the safety valves of electrical systems; all circuits should be so protected. Sometimes copper wire is carelessly inserted in place of a fuse, thus permitting too heavy a current to pass through the circuit, with serious results. The use of too large fuses is a frequent cause of fire, and it is very necessary that the fuse be of a size suitable for the load of the circuit. Fuses in which the fuse wires are enclosed are recommended.

Motors and Generators

All motors and generators should be installed in a dry place and should not be exposed to corrosive fumes, inflammable gases or flying material, such as dust and lint. Sparks from the commutator may ignite gases or dust, therefore in hazardous locations it is advisable that motors be entirely enclosed (air may be supplied from an outside source and discharged against the outside) or else be installed outside of the room and the shaft extended through wall. Proper lubrication of motor and generator bearings is, of course, essential to prevent overheating and possible fire.

(To be continued)

A Safety Campaign for a Year for 2 Cents a Month!

DID you ever stop to realize what a Safety Calendar would do for you in the homes of your employes—a safety "bulletin" automatically changed each month! Several hundred thousand Safety Calendars have been so used in the last few years.

DID you ever stop to think of the fact that a sure way to reach your workmen is through their wives and children? The Safety Calendar will interest the whole family.

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DID you ever stop to realize that humorous pictures are a universal language? The Safety Calendar carries its lesson to men and women, old and young, of all nationalities and all degrees of education.

A NOTE on your letterhead will bring a sample copy. Write today.

National Safety Council

Co-operative—Non-commercial
168 North Michigan Avenue, Chicago, Ill.

New Machinery and Equipment

New Blaw-Knox Bucket

THE new type of clamshell bucket, the Algoma, is designed to handle coal and ore from piles into boats. It has great closing power. The closed length of the bucket is extremely small as compared to the open length, a phase very necessary when it is considered that a bucket must be lowered into a vessel hatchway and when opened preparatory to gathering its load must take up as little vertical overall space as possible between decks.

Blaw-Knox Algoma Bucket

An interesting test has shown that the weight of this bucket is 11,080 lbs. and that the average load picked up is 11,000 lbs.—in other words, the bucket picks up its own weight in material. It was also found that 13 loads filled a transfer car as full as 17 loads of the other bucket.

While buckets of this type are in nearly all cases large buckets, the initial investment is so offset by the short time taken to load and unload a ship that the bucket cost is itself negligible and can be disregarded in view of its great saving.

Miller Mechanical Gas Producer

THE principal blast distributor of the gas producer manufactured by the W. R. Miller Co., Pittsburgh, Pa., is located on the exterior and the small grate sections are of easy access through the sealed doors on the outside of the stationary wind box. The blast is supplied by four blowers. Each grate section has a blank space to prevent the blast from the blowers cutting channels through the interior; the sections revolve or can be made stationary. They are like the sections used in the Miller hand-poked producer, and do not require replacement in from 5 to 11 years, being protected by the blast.

In the event of clogging or burning out, the small distributor inside the producer can be replaced quickly and conveniently, as the blast from the exterior will permit the operation of the producer until replacement can be made without interruption to plant operation.

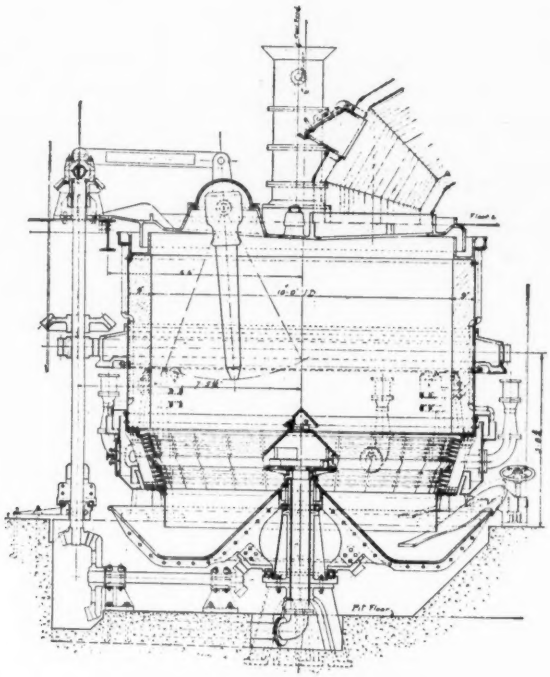
All ash and clinker have free fall to the ash pan; there is no obstruction, such as the distributor arms, to prevent the fall. The ashes are removed from the water-sealed revolving ash pan by lowering a stationary shovel and are then discharged into a car or bucket or onto a conveyor.

When located in the interior of the producer the distributor must have necessarily considerable dimensions or be built with branches to secure sufficient distribution to gasify the coal thoroughly. This distributor is then an impediment to free ash or clinker discharge and is likely to clog or be destroyed by the heat.

Free ash discharge permits lowering the fuel bed without breaking it up.

This producer has a double fuel feed to prevent the gases from escaping; it operates automatically, thus regulating the amount of fuel going into the producer.

A rotary wall cleaner is another important feature which is intended to keep the walls of the producer free from clinker. This wall cleaner is water-cooled and rotates within itself in close proximity to the revolving walls of the producer.



Miller mechanical gas producer

The question of the use of a poker is a mooted one; for instance, take two mechanical producers gasifying practically an equal amount of coal and with equal results—one with, the other without a poker arrangement—the quality of the gas produced is about the same. A poker is used where the coal is inferior and mats or clinkers; the poker will break them up.

On the other hand, the producer cost will be considerably higher with a poker arrangement. The Miller producer is built with or without this arrangement.

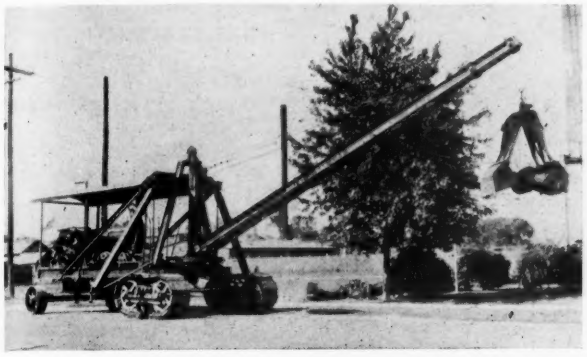
A drag or leveler is not required where a twin automatic feed is used in connection with a revolving body, and to all intents and purposes is a useless expenditure.

This producer embodies all the principal features of the leading mechanical machines now offered to the trade, with the added advantages mentioned.

Motor Crane with Caterpillar Type Mounting

A NEW TYPE of motor crane, with caterpillar mounting, has been developed by the Bay City Dredge Works, Bay City, Mich., that should prove to be useful to rock products producers.

The car body of this crane is built up of four heavy structural I-beams riveted on both ends and in the center to heavy cross-members, making a rigid framework. The dimensions are: Length, 19 ft.; width, 6 ft. 6 in.; width outside of wheels, 10 ft.; height from ground to top of A-frame, 13 ft. 4 in. Heavy out-riggers are located at each side of the crane, hinged at both top and bottom and are easily placed and adjusted.



Motor crane of Caterpillar type mounting

This crane is regularly mounted on four heavy steel wheels. The front wheels are 42 in. diameter, 16 in. face, with cleats to prevent skidding. The rear wheels are 32 in. diameter, 14 in. face. This crane may be mounted on wide-face road wheels, standard railroad wheels, or on crawler trucks of the caterpillar type under either or both ends.

All parts, the drums, gears and the shafting are heavily and substantially constructed, and all of these parts are easily accessible for inspection or repairs. The three main drums, hoisting, auxiliary or opening and boom hoist, are each on separate shafts and are brass bushed. The swinging and propelling motions are controlled by the same friction clutches. The operating motions, hoisting, swinging and propelling, are controlled by friction clutches of large capacity.

Two winch heads, provided on each side of the car body, are controlled by friction clutches and operate independently of all other motions.

All sprocket chains are heavy duty type with roller bushings and take-up for adjustment. A heavy spur gear differential, with case-hardened steel gears substantially enclosed and running in oil, is provided. All of the operating levers are at the front of the crane, giving the operator a clear and unobstructed view of his work at all times.

The gasoline engine furnished with this crane is a heavy duty type four-cylinder 5x7½ in., developing a 40 hp. maximum brake test. It is completely equipped with a high-tension magneto, impulse starter, water circulating pump, force feed oiler and automatic governor. The water cooler is of the rectangular air tube type with fan. The engine is provided with an outside band type clutch, with Hyatt roller bearing at the engine end of shaft, and there is a 30-gallon fuel tank with gravity feed.

In place of the gasoline engine, an electric motor of suitable capacity and any required voltage can be furnished.

The standard boom is 30 ft. long, built up of steel channels, braced together by steel plates and bars. There is a cable guard at the point of the boom and a tag line for steadying the bucket operates within the boom channels. This counterweight can also be used in carrying electric magnet cable. A longer boom can be furnished if necessary.

There is also a steel canopy covering the entire machinery. An enclosed cab with doors and windows can be furnished when required at additional cost.

Bradley Hercules Pulverizer Mill

THIS semi-fine preliminary pulverizer grinds both wet and dry raw materials and cement clinker. Because of this uniformly fine-ground product the Bradley mill, in combination with the tube mill used for final grinding, will bring down the manufacture of raw material or cement clinker to the lowest cost.

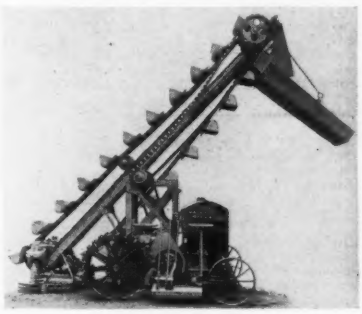
An average of 40 tons per hour when grinding the raw materials to a fineness of from 50 to 60 per cent through 100 mesh is claimed by the manufacturer, the Bradley Pulverizer Co., 92 State street, Boston, Mass. The mill is also adapted to agricultural limestone.

Wagon Loader with New Grip Wheel Attachment

UNDER CONDITIONS where full caterpillar tractions more than meets the necessity for complete traction, the Austin Machinery Corp., Chicago, Ill., has equipped its standard wagon loader with a grip wheel attachment and wide-faced front wheels.

Crane at work on crushed stone pile

In the illustration it can be noted that the steel toothed shoes form a solid steel track, enabling the loader to work ahead steadily under full tractive power. Moreover, the grip wheels are self-cleaning, as they automatically throw off the material even when operating under the most unfavorable conditions.



Wagon loader

On road jobs, working often on a muddy sub-grade, the loader with this device gets full traction. When operating in gravel pits or coal piles, as the machine eats into the bank or pile, a firm footing is maintained, without slippage or lost traction, and the buckets are driven into the material with a steadiness which insures their going up to their destination fully loaded.

The field of definite use for the grip wheel, entering as it does between the wide-faced wheel with lugs and the complete caterpillar traction, will eventually be extended to include other lines of machinery.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.50 per net ton all sizes—Winter prices from stock					
Burlington, Vt.	1.00	.....	2.50	2.00	2.00	.....
Chaumont, N. Y.	1.00	1.75	1.75	1.25	1.25	1.25
Cobleskill, N. Y.	1.25	1.25	1.15	1.15	1.15	.....
Coldwater, N. Y.	1.50 per net ton, all sizes					
Eastern New York	.75	1.60	1.60	1.60	1.60	1.50
Eastern Penna.	1.00	1.75	1.75	1.50	1.50	1.50
Munns, N. Y.	.70	1.15	1.15	1.15	1.15	1.15
Walford, Pa.	1.00	.....	1.60	1.60	1.60	1.60
Western New York	.70	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alden, Ia.	.80@1.00	.80@1.00	1.50	1.45	.....	.....
Alton, Ill.	2.00	.....	1.50	1.40	1.35	.....
Bettendorf, Ia.	All sizes, 2.00 cu. yd. f.o.b. quarry					
Buffalo, Iowa	1.60	1.30	1.40	1.20	1.25	1.30
Chicago, Ill.	1.00	1.40	1.00	1.00	1.00	1.00
Dundas, Ont.	1.00	1.50	1.50	1.50	1.25	1.20
Eden and Knowles, Wis.	1.30	1.30	1.30	1.30	1.30	.....
Faribault, Minn.	.....	.....	.....	.....	2.00	.....
Greencastle, Ind.	1.00@1.25	1.25	1.00	1.00	1.00	1.00
Illinois, Southern	1.75	1.60	1.50	1.50	1.40	.....
Kokomo, Ind.	1.10	1.25	1.25	1.10	1.10	1.10
Krause or Columbia, Ill.	1.40	1.25	1.25	1.10	1.10	1.10
Lannon, Wis.	.90	1.00	1.00	1.00	1.00	1.00
Marblehead and Brillion, Wis.	1.10	.....	1.20	1.10	1.10	.....
Montrose, Ia.	1.35@1.50	1.60	1.50@1.60	1.60	1.50	1.50
Oshkosh, Wis.	1.40 per ton, all sizes					
Sheboygan, Wis.	1.05@1.30	1.00	1.00	1.00	1.00	1.00
Southern Illinois	1.50	1.40	1.40	1.40	1.30	.....
Stolle, Ill. (I. C. R. R.)	1.55	1.55	1.55	1.30@1.35	1.50	1.50
Stone City, Iowa	.50	.....	1.40	1.35	1.30	.....
Toledo, Ohio	1.84	1.99	1.99	1.99	1.84	1.84
Toronto, Canada	1.90	2.40	2.40	2.15	2.15	2.10@2.15
Valmeyer, Ill.	1.60	1.30	1.30	1.30	1.30	1.30
SOUTHERN:	These prices include 90c freight					
Cartersville, Ga.	.....	2.00	.....	1.25	1.25	.....
Chickamauga, Tenn.	1.10	1.00	.....	1.00	.93	.....
Dallas, Texas	1.10	1.25	1.25	1.25	1.25	1.10
El Paso, Tex.	1.00	1.00	1.00	1.00	1.00	.....
Fort Springs, W. Va.	1.35	1.65	2.00	1.60	1.50	1.45
Garnet and Tulsa, Okla.	.50	1.60	1.60	1.45	1.45	.....
Ladds, Ga.	1.25	.....	.....	1.25	1.25	1.25
Morris Spur (near Dallas) Tex.	1.10	1.25	1.25	1.25	1.25	1.25
Portland, Ga.	.60@1.00		(All other sizes 1.00@1.25)			
Shephard, Tenn.	1.00@1.25	1.00@1.25	1.00@1.25	.75@1.00	.75@1.00	.....
WESTERN:						
Atchison, Kans.	.50	2.10 (Rip-rap.	2.10	2.10 1.80 per ton)	2.10	2.10
Blue Springs and Wymore, Neb.	.20	1.65	1.65	1.55@1.60	1.45@1.50	1.40
Bromide, Okla.	.60	1.50	1.50	1.50	1.30	1.30
Cape Girardeau, Mo.	1.50	.....	1.50	1.50	1.25	.....
Kansas City, Mo.	1.00	1.80	2.00	2.00	2.00	2.00

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Baltimore, Md.	1.25	2.50	2.35	2.25	2.00@2.25	2.00
Bernardsville, N. J.	2.00	2.20	2.00	1.80	1.50	.....
Branford, Conn.	.60	1.50	1.25	1.15	1.10	.....
Bound Brook, N. J.	2.00	2.20	2.00	1.70	1.60	.....
Dresser Jct., Wis.	1.00	2.25	2.25	2.00	1.75	1.75
Duluth, Minn.	.75@1.00	2.25	1.90@2.00	1.35@1.50	1.35@1.50	1.35@1.50
Dwight Station, Calif.	.75@1.00—all sizes					
E. Summit, N. J.	2.10	2.35	2.15	1.75	1.75	.....
Eastern Mass.	.60	1.95	1.75	1.50	1.50	1.50
Eastern New York	1.00	1.80	1.70	1.50	1.50	1.50
Eastern Penna.	1.25	1.90	1.80	1.60	1.50	1.50
New Britain, Middlefield, Rocky Hill, Meriden, Conn.	.60@ .80	1.60@1.75	1.50	1.25	1.10	.....
Oakland, Calif.	1.75	1.75	1.75	1.50	1.50	1.50
Richmond, Calif.	.50*	.....	1.75*	1.50*	1.50*	.....
San Diego, Calif.	.50@ .70	1.45@1.75	1.40@1.70	1.30@1.60	1.25@1.55	1.25@1.55
Springfield, N. J.	2.00	2.25	2.10	1.85	1.85	1.85
Westfield, Mass.	.60	1.35	1.30	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Alexandria Bay, N. Y.	1.60	.....	1.30	1.50	1.20	.....
Columbia, S. C.—Granite	.75	.....	2.75	2.50	2.35	.....
Dell Rapids, S. D.—Granite	.75	2.00	2.10	2.10	1.60	.....
Dundas, Ont.—Flint	1.00	1.50	1.50	1.50	1.25	1.20
Eastern Penna.—Sandstone	1.00	1.75	1.75	1.50	1.50	1.50
Eastern Penna.—Quartzite	.90	1.60	1.40	1.30	1.30	1.30
Holton, Ga.—Granite	.40	.....	2.50	2.25	2.25	2.00
Lohrville, Wis.—Cr. Granite	1.35	1.40	1.30	.....	1.20	.....
Los Angeles, Cal.—Granite	.....	1.25@1.50	1.15@1.40	1.15@1.40	.....	.....
Macon, Ga.—Granite	.50	.....	2.50	2.25	2.00	2.00
Middlebrook, Mo.—Granite	3.50@4.00	.....	.....	2.00@2.25	.....	1.50@1.75
Red Granite, Wis.	1.35	1.40	1.30	1.50	1.20	.....
Sioux Falls, S. D.—Granite	.75	2.00	2.00	2.10	1.60	.....
Stockbridge, Ga.—Granite	.50	2 00	1.90	1.75	1.75	.....
Utley, Wis.	1.35	1.40	1.30	1.50	1.20	.....

*Cubic yard. †Agrl. lime. ||R. R. ballast. §Flux ‡Rip-rap. a 3-inch and less.

Agricultural Limestone

EASTERN:

Chaumont, N. Y. — Analysis, 95% $CaCO_3$, 1.14% $MgCO_3$ — Thru 100 mesh; sacks, 4.00; bulk 2.50

Coldwater, N. Y.—Analysis, 56.77% $CaCO_3$, 41.74% $MgCO_3$, 70% thru 200 mesh, 95% thru 50 mesh, sacks 4.00; bulk 3.00

Grove City, Pa. — Analysis, 94.75% $CaCO_3$, 1.20% $MgCO_3$ — 70% thru 100 mesh; 80 lb. ppr., 5.50; bulk..... 4.50

Hillsville, Pa.—70% thru 100 mesh; sacks, 4.75; bulk 3.00

Jamesville, N. Y. — Analysis, 89.25% $CaCO_3$, 5.25% $MgCO_3$; sacks, 4.50; bulk 2.75

New Castle, Pa.—89% $CaCO_3$, 1.4% $MgCO_3$—75% thru 100 mesh, 84% thru 50 mesh, 100% thru 10 mesh; sacks, 4.75; bulk 3.00

Texas, Md.—Analysis, 58.02% $CaCO_3$, 37.3% $MgCO_3$—50% thru 50 mesh; bags, 4.25; bulk 2.50

Walford, Pa. — 50% thru 100 mesh, 60% thru 50 mesh, 100% thru 10 mesh; sacks, 4.75; bulk..... 3.00

West Stockbridge, Mass., Danbury, Conn., North Pownal, Vt.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 5.00—cloth, 5.25; bulk.. 3.50

Williamsport, Pa. — Analysis, 88-90% $CaCO_3$, 3-4% $MgCO_3$—50% thru 50 mesh; paper, 5.50; bulk..... 4.00

CENTRAL:

Alton, Ill. — Analysis, 96% $CaCO_3$, 0.3% $MgCO_3$—90% thru 100 mesh.... 6.00

Bedford, Ind. — Analysis, 98.5% $CaCO_3$, .5% $MgCO_3$—90% thru 10 mesh ..... 1.60@2.00

Belleville, Ont. — Analysis, 90.9% $CaCO_3$, 1.15% $MgCO_3$—45% to 50% thru 100 mesh, 61% to 70% thru 50 mesh; bulk 2.50

Bettendorf, Ia.—Analysis, 96.14% $CaCO_3$, 2.5% $MgCO_3$—50% thru 100 mesh, 2.00; 50% thru 4 mesh..... 2.00

Buffalo, Ia.—90% thru 4 mesh..... 1.00

Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.3% $MgCO_3$ (90% thru 50 mesh, 2.00), 50% thru 4 mesh..... 1.50

Chicago, Ill.—Analysis, 53.63% $CaCO_3$, 37.51% $MgCO_3$—90% thru 4 mesh.... 1.00

Columbia, Ill., near East St. Louis—½-in. down ..... 1.25@1.80

Detroit, Mich.—Analysis, 88% $CaCO_3$, 7% $MgCO_3$—75% thru 200 mesh, 2.50@4.75—60% thru 100 mesh..... 1.80@3.80

Elmhurst, Ill. — Analysis, 35.73% $CaCO_3$, 20.69% $MgCO_3$—50% thru 50 mesh 1.25

Greencastle, Ind. — Analysis, 98% $CaCO_3$—50% thru 50 mesh..... 2.00

Krause and Columbia, Ill.—Analysis, 90% $CaCO_3$, 90% thru 4 mesh..... 1.40

Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$—90% thru 50 mesh..... 2.00

Marblehead, O.—Analysis, 33.42% $CaCO_3$, 4.29% $MgCO_3$—52.4% thru 100 mesh, 59.4% thru 50 mesh, 100% thru 10 mesh; sacks, 4.75; bulk..... 3.00

Limestone screenings; bulk..... 1.50

McCook, Ill.—Analysis, 54.10% $CaCO_3$, 45.04% $MgCO_3$—100% thru ¼-in. sieve, 78.12% thru No. 10, 53.29% thru No. 20, 38.14% thru No. 30, 34.86% thru No. 50, 22% thru 100 ..... 1.50

Milltown, Ind. — Analysis, 93.10% $CaCO_3$, 3.2% $MgCO_3$—33.2% thru 100 mesh, 40% thru 100 mesh..... 1.25@1.65

Mitchell, Ind.—50% thru 100 mesh..... 2.00

Montrose, Ia.—90% thru 100 mesh..... 1.35

Narlo, Ohio—Analysis 56% $CaCO_3$, 43% $MgCO_3$, limestone screenings, 37% thru 100 mesh; 55% thru 50 mesh; 100% thru 4 mesh..... 1.50@2.00

Ohio (different points), 20% thru 100 mesh; bulk ..... 1.25@1.50

Piqua, O. — Analysis, 82.8% $CaCO_3$, 8.2% $MgCO_3$; neutralizing power in terms of calcium carbonate, 95.3%—50% thru 100 mesh..... 3.25@5.00

50% thru 50 mesh..... 1.75@2.00

River Rouge, Mich. — Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk..... .80@1.40

Stolle, Ill., near East St. Louis on I. C. R. R. — Thru ¼-in. mesh — Analysis, 89.61% to 89.91% $CaCO_3$, 3.82% $MgCO_3$ 1.75

Stone City, Ia.—Analysis, 98% $CaCO_3$ 50% thru 100 mesh..... .50

Toledo, Ohio—¼-in. to dust, 20% thru 100 mesh 1.50

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Gray Roofing Slate, f.o.b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	$ 9.30	$8.40	$8.10	$7.80
24x14	9.30	8.40	8.10	7.80
22x12	10.80	8.70	8.40	9.10
22x11	10.80	8.70	8.40	9.10
20x12	10.80	8.70	8.40	9.10
20x10	11.70	9.00	8.70	8.40
18x10	11.70	9.00	8.70	8.40
18x 9	11.70	9.00	8.70	8.40
16x10	11.70	8.40	8.40	8.10
16x 9	11.70	8.40	8.40	8.10
16x 8	11.70	8.40	8.40	8.10
18x12	11.10	8.70	8.40	8.10
16x12	11.10	8.70	8.40	8.10
14x10	11.10	8.40	8.10	7.80
14x 8	11.10	8.40	8.10	7.80
14x7 to 12x6	9.60	8.40	8.10	.....
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$7.50	$7.20	$5.75
22x11	8.40	7.80	7.50	5.75
Other sizes	8.70	8.10	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.
Granulated slate per net ton f. o. b. quarries, Vermont and New York, 7.50

(Continued from preceding page)

Ground Rock

Wales, Tenn.—B.P.L. 70%	7.75
Per 2000-lb. Ton	
Centerville, Tenn. — B.P.L. 60% to 65%	4.50@5.50
B.P.L. 75% (brown rock)	12.00
Columbia, Tenn.—B.P.L. 68% to 72%	5.50
B.P.L. 65% (90% thru 200 mesh) bulk	5.50
Mt Pleasant, Tenn — B.P.L. 68%—	
13% Phosphorus	7.50@9.00
14% Phosphorus	8.00
B.P.L. 65@70%	7.00@9.00
Norwills, Fla.—(Fla. Hard Rock)—	
B.P.L. 68%	10.00

Florida Soft Phosphate

Raw Land Pebble

Per Ton	
Bartow and Norwills, Fla.—B.P.L. 50%, bulk	6.00@ 8.00
B.P.L. 78%, bulk	13.50
Jacksonville (Fla.) District	10.00@12.00

Ground Land Pebble

Per Ton	
Jacksonville (Fla.) District	14.00
Add 2.50 for sacks.	
Lakeland, Fla.—B.P.L. 60%	6.00
Morristown, Fla.—26% phos. acid	16.00
Mt. Pleasant, Tenn.—65-70% B.P.L.	6.00@ 7.00

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Bound Brook, N. J.—Trap rock, carload lots; bulk		2.30
Chicago, Ill.—Stucco chips, in sacks f.o.b quarries		17.50
Deerfield, Md. — Green; bulk	7.00	7.00
Easton, Pa.—Evergreen, creme green and royal green marble	16.00@20.00	11.00@17.00
Lincoln, Neb. — Red, white, grey, in bags		30.00
Middlebrook, Mo.—Red granite; sacks	30.00@32.50	20.00@22.50
Milwaukee, Wis.	21.00@30.00	21.00@27.50
Missouri river points — Different colors	20.00@25.00	20.00@25.00
Piqua, O.—Marble	8.00@10.00	7.00@ 9.00
Sioux Falls and Red Granite, Wis.	7.50	7.50
Tuckahoe, N. Y.—White marble	7.00@12.00	12.00
Crushed white stone and marble dust in 100 lb. bags	6.50@12.00	
Tate, Ga.—White limestone, sacks extra	5.00@ 7.00	5.00@ 7.00
Wausau, Wis.	14.00@18.00	
Wisconsin and S. Dak. points—Granite, different colors, bulk or sacks	1.50@ 2.00	3.00@ 7.00
Granite dust in bags	6.00	

Concrete Brick

Prices given per 1,000 brick, f. o. b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	18.00	26.00@38.00
Bellow Falls, Vt.	18.00	25.00
Birmingham, Ala.	16.00	27.50@50.00
Carpenterville, N. J.	15.50	40.00@65.00
Bridgeport, Conn.	31.00	32.00
Rochester, N. Y.	21.00	
Friesland, Wis.	25.00	
Houston, Tex.		21.00
Lockport, N. Y.	17.00	
Milwaukee, Wis.	12.50	26.00@40.00
Omaha, Nebr.	16.00	30.00@35.00
Piqua, O.	15.00	25.00@50.00
Phoenix, Ariz.	16.00	35.00@80.00
Portland, Ore.	25.00	45.00@75.00
Puyallup, Wash.	22.00	35.00@75.00
Rapid City, S. D.	20.00	30.00@60.00
St. Paul, Minn.	15.00	30.00&35.00
Salt Lake City, Utah.	20.00	40.00
Salem, Ore.	30.00	50.00@100.00
Seattle, Wash. (select)	20.00	50.00@75.00
Springfield, Ill.	18.00	20.00@25.00
Walkersville, Ont.	30.00	36.00
Wauwatosa, Wis.	14.00@15.00	30.00
Winnipeg, Man., Can.	19.00	40.00

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	7.00
Barton, Wis.	8.50
Boston, Mass.	12.00@13.00
Buffalo, N. Y.	16.50
El Paso, Texas (Face 13.00)	14.00
Gary, Ind.	11.50@12.00
Grand Rapids, Mich.	13.00
Lancaster, N. Y.	13.50
Michigan City, Ind.	10.00
Milwaukee, Wis. (delivered at job)	13.00
Minneapolis, Minn.	13.00
Plant City, Fla.	10.00
Portage, Wis.—Common	15.00
Face	25.00
Redfield, Mass.	15.00
San Antonio Texas—Common	14.00
Face	27.50
South Dayton, Ohio	14.50
Syracuse, N. Y. (delivered at job)	18.00
F. o. b. cars	13.00@14.00
Washington, D. C.	13.50
Winnipeg, Can.	14.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrate per Ton Finishing	Common
Atlanta, Ga.	19.00	16.00
Baltimore, Md.	15.00	13.00
Boston, Mass.	23.00	20.00
Cincinnati, Ohio	19.60	14.50
Chicago, Ill.	18.00	.....
Dallas, Tex.	25.00	.....
Denver, Colo.	30.00	.....
Detroit, Mich.	15.75	13.75
Fort Dodge, Ia.	19.70	17.00
Genoa, Ohio	10.50	.....
Grand Rapids, Mich.	15.65	.....
Gypsum, Ohio	13.90	.....
Los Angeles, Calif.	.....	30.00
Minneapolis, Minn.	29.00	22.00
Montreal, Que.	21.00	21.00
New Orleans, La.		17.25
New York, N. Y.	16.99	.....
Plasterco, Va.	19.80	.....
St. Louis, Mo.	23.20	20.00
San Francisco, Calif.	22.00	18.00
Seattle, Wash.	24.00	.....

	Lump per 180-lb. Barrel (net) Finishing	Common
Atlanta, Ga.	2.00	1.60
Baltimore, Md.	.....	12.00
Boston, Mass.	3.40	3.10
Cincinnati, Ohio	.....	12.25
Chicago, Ill.	.....	1.65
Dallas, Tex.	.....	2.75
Denver, Colo.	2.95	.....
Detroit, Mich.	2.00	1.80
Los Angeles, Calif.	3.00*	3.00*
Minneapolis, Minn.	.....	1.50
Montreal, Que.	15.00†	.....
New Orleans, La.	.....	1.75
New York, N. Y.	.....	3.69*
St. Louis, Mo.	.....	1.65
San Francisco, Calif.	.....	2.25
Seattle, Wash.	3.50	2.75

*280-bbl. (net). †Per ton.

Portland Cement

Current prices per barrel in carload lots, f. o. b. cars, without bags.

Atlanta, Ga. (bags)	3.45
Boston, Mass.	2.86
Cedar Rapids, Ia.	2.28
Cincinnati, Ohio	2.37
Cleveland, Ohio	2.28
Chicago, Ill.	1.97
Dallas, Tex., incl. sacks 10c ea., 2.80; net	2.40
Davenport, Ia.	2.22
Denver, Colo.	2.90
Detroit, Mich.	2.31
Duluth, Minn.	1.95
Indianapolis, Ind.	2.23
Kansas City, Mo. (includes sacks)	2.85
Los Angeles, Calif.	3.31
Milwaukee, Wis.	2.19
Minneapolis, Minn.	2.26
New Orleans, La.	3.20
New York, N. Y. (includes bags)	2.50
(10c per bbl. discount in 10 days)	
Pittsburgh, Pa.	2.02
St. Louis, Mo.	2.25
San Francisco, Calif.	3.09
(Pkge. 15c on and off.)	
St. Paul, Minn.	2.26
Toledo, Ohio	2.31
Seattle, Wash., f. o. b. factory	2.75
F. o. b. Seattle (including sacks)	3.50

NOTE—Add 40c per bbl. for bags.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco* Calcined Gypsum	Cement‡ and Gauging Plaster	Wood Fiber	White§ Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board—½x32x36" Weight 1500 lbs. Per M Sq. Ft.	Plaster Board—⅜x32x36" Weight 1850 lbs. Per M Sq. Ft.	Wallboard, ⅜x32 or 48", Lengths 6'-10', 1850 lbs. Per M Sq. Ft.
Alabaster, Mich.	3.50	4.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue Rapids, Kan.	3.50	4.50	7.50	9.00	11.00	11.50	11.00	.....	23.75	20.00	19.375	20.00	36.75
Centerville, Iowa	3.50	4.50	7.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas, Ariz.	.....	4.00‖	.....	.....	.....	10.50@12.00a	.....	.....	.....	10.50@11.50a	.....	.....	.....
†Eldorado, Okla.	.....	.....	.....	.....	11.00	11.50	.....	.....	15.50	.....	27.20	29.30	39.55
Fort Dodge, Ia.	3.50	3.50	7.50	9.00@11.00	11.00	11.50	16.45@22.00	.....	25.80	22.00	19.375	20.00	30.00
Garhutt, N. Y.	.....	.....	7.50	9.00	11.00	11.00	.....	7.50	.....	.....	.....	20.00	Plus bags
Grand Rapids, Mich.	3.50	4.50	7.50@8.50	9.00@12.00	11.00	11.00	19.50	.....	27.25	22.00	19.375@25.00	20.00@26.25	30.00
Gypsum, Ohio	3.50	4.50	7.50	9.00	11.00	11.00	20.25	8.00	27.95	20.00	19.375	20.00	30.00
Loveland, Colo.	3.50	4.50	7.50	9.00	11.00	11.50	.....	.....	29.80	.....	.....	.....	.....
Oakfield, N. Y.	3.50	4.50	7.50	9.00	11.00	11.00	21.20	7.50+	28.25	22.00	19.375	20.00	30.00
Piedmont, S. D.	.....	.....	7.50	9.00	11.00	11.50	.....	.....	32.25	.....	27.97	31.04	41.18
Plasterco, Va.	4.50	.....	7.00	9.00	11.00	21.90	.....	.....	29.90	20.00	21.375	22.00	.....
†Southard, Okla.	3.50	4.50	7.50	9.00	11.00	11.50	11.00	.....	15.50	.....	26.20	28.70	39.40

NOTE—Returnable Jute Bags, 15c each, $3.00 per ton; Paper Bags, $1.00 per ton extra.
* Shipment in bulk 25c per ton less; †Acme, Tex., freight rates govern; ‡Bond Plaster $1.50 per ton additional; +Sanded Wood Fiber $2.50 per ton additional; §White Moulding 50c per ton additional; ‖Bulk; (a) Includes sacks.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Allentown, Pa.	2.25	.90	1.50	1.00	1.00	1.00	1.00
Buffalo, N. Y.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	3.50	1.10	2.50	1.25	1.25	1.25	1.25
Eastern Pennsylvania and Northern New Jersey	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Erie, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Emporium, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Lebanon, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Sharpsville and West Middlesex, Pa.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
Western Pennsylvania	2.50	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Chicago, Ill.			All sizes, $1.50, F. O. B. Chicago				
Detroit, Mich.			All sizes, 1.65, F. O. B. Detroit				
Ironton, O.	2.40	1.75	Other grades 1.75				
Jackson, O.	2.00	1.35	1.70	1.35	1.35	1.35	1.35
Steubenville, O.	2.00	1.40	1.70	1.40	1.40	1.40	1.40
Toledo, O.	2.93	2.30	2.49	2.49	2.49	2.30	2.30
Youngstown, Dover, Hubbard, Leetonia, Struthers, Steubenville, Lowellville & Canton, O.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
SOUTHERN:							
Alabama City, Ala.	2.05	.80	1.00@1.25	1.15	1.05@1.10	.85@1.00	.85@ .90
Birmingham, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Ensley, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Longdale, Goshen, Glen Wilton & Low Moor, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing Hydrate	Masons' Hydrate	Agricultural Hydrate	Chemical Hydrate	Ground Burnt Lime Blk.	Ground Burnt Lime Bags	Lump Lime Blk.	Lump Lime Bbl.
EASTERN:								
Adams, Mass.			7.50					3.50
Bellefonte, Pa.			11.50		8.00			
Berkley, R. I.			14.00					
Buffalo, N. Y.		11.00	11.00	11.00			9.50	2.00*
Chaumont, N. Y.					2.50	4.00		
Paxtang and Le Moyne, Pa.					5.00	5.00@7.50		
Rockland, Maine						8.00		
Union Bridge, Md.			13.00		5.50			
West Stockbridge, Mass.			15.00					
Williams and Blue Bell, Pa.			11.25					
Williamsport, Pa.					10.00	10.00	6.00	
York, Pa.		11.50	11.50	11.50			7.50	3.00‖
CENTRAL:								
Delaware, Ohio	10.50	9.00	8.00	9.50			8.00	1.60
Geneo, Ohio	10.50§							
Gibsonburg, Ohio	10.50§	8.50	8.50				7.00	
Huntington, Ind.	10.50	9.00	8.50				8.00	1.70*
Knowles and Valders, Wis.			12.50		5.00	9.00		
Marblehead, Ohio		9.00	8.50				8.00	1.70*
Mitchell, Ind.		12.00	12.00	12.00			9.00	1.75*
Sheboygan, Wis.					5.50	8.50		
White Rock, Ohio	10.50							
Woodville, O. (dlrs.' price)	10.50a	8.50a	8.00a	8.50a	7.50	8.00	8.00	1.70
SOUTHERN:								
El Paso, Tex.							12.50	
Knoxville, Tenn.	11.00	9.50	9.50				7.50	1.30
Sherwood, Tenn.	11.00	9.50	9.50	9.50	7.50		7.50	1.30
Staunton, Va.					8.00		9.50b	1.60
WESTERN:								
Colton, Calif.			15.00					
Kirtland, N. Mex.					12.00		15.00	2.00c
Los Angeles, Calif.			15.00‡					
San Francisco, Calif.			19.50				16.00	2.15*
Tehachapi, Calif.						15.00		2.00

‡100-lb. sacks; *180-lb. net, price per barrel; †180-lb. net, non-returnable metal barrel; ‖300-lb. bbl. §Paper sacks. a 50-lb. paper bags; terms, 30 days net; 25c per ton or 5c per bbl. discount for cash in 10 days from date of invoice. b Burlap bags. c 200 lb. bbl.

Miscellaneous Sands

(Continued from preceding page)

Conneaut, O.—Molding fine	**2.25@2.50**
Molding coarse	**2.00@2.25**
Delaware, N. J.—Molding fine	**2.00**
Molding coarse	**1.90**
Brass Molding	**2.15**
Dresden, O.—Molding coarse	1.50@1.75
Brass molding	1.75
Dunbar, Pa.—Traction, damp	2.75
Dundee and Chalfants, O.—Sand blast	**3.00**
Glass, core and traction	**2.75**
Molding fine and brass molding	**2.25**
Furnace lining	**2.50**
Molding coarse	**2.00**
Falls Creek, Pa.—Glass sand	**2.50**
Furnace lining, traction and molding coarse	**2.00**
Sand blast	**3.50**
Eau Claire, Wis.—Core	**.75@1.25**
Sand blast	**3.00@4.25**
Traction sand	**.50**
Franklin, Pa. and Utica, Pa.—Traction	**2.50**
Brass molding	**2.25**
Core	**1.50@2.00**
Molding fine	**2.25**
Molding coarse	**2.00**
Sand blast	**5.00**
Greenville, Ill.—Molding coarse	1.25@1.60
Howard, O.—Glass sand	3.00
Molding—Fine and coarse	1.75@2.00
Stone sawing	2.00
Core, roofing and brass molding	1.75@2.25
Sand blast	4.00
Furnace lining and traction	1.75@2.00
Joliet, Ill.—Milled, dried and screened No. 2 coarse molding sand and open hearth loam and looting clay	.90@1.25
Kansas City, Mo.—Missouri River core	.80
Kasota, Minn.—Molding coarse and fine, stone sawing (pit run)	**1.75**
Klondike and Gray Summit, Mo.—Molding fine	2.00@2.50
Molding coarse	2.50@3.00
Mapleton, Pa.—Core, furnace lining, molding coarse and brass molding	2.00@2.75
Molding fine	2.25@2.75
Roofing sand	2.00@3.00
Sand blast	1.50@2.00
Glass sand	2.25@2.50
Massillon, O.—Traction, molding fine and coarse, core, and furnace lining	2.50
Glass sand	3.00
Michigan City, Ind.—Core, glass, traction and brass molding	.30@ .40
Millington, Ill.—Glass, core, furnace lining, roofing and stone sawing	1.25@1.50
Banding sand	6.00
Mineral Ridge, Ohio—Core, furnace lining, molding fine and coarse, roofing, sand blast, stone sawing and traction (green)	2.00
Montoursville Pa.—Core	1.25@1.50
Traction	1.00
Brass molding	1.40@1.50
New Lexington, O.—Molding fine	2.00
Molding coarse	1.75
Sand blast	3.00
Glass, core and traction	2.75
Furnace lining	**2.50**
Brass molding	2.25

Miscellaneous Sands

(Continued)

Oregon, Ill.—Core and glass sand	**2.00**
Furnace lining	**2.00**
Molding fine and coarse	**1.00**
Sand blast	**3.50**
Ottawa, Ill.—Furnace lining, steel molding	1.50
Roofing sand	1.25@4.50
Sand blast	4.50
Ottawa, Minn.—Core	1.00@1.50
Glass, molding coarse, stone sawing (all crude silica)	1.00@1.50
Ridgeway, Pa.—Glass sand, green	**2.25**
Glass sand, wash	**2.50**
Molding, fine and coarse	**1.20**
Rockwood, Mich.—Core, damp	2.50
Roofing	3.00
Sand blast	3.50@3.75
Round Top, Md.—Glass sand	1.75@2.00
Core, furnace lining	1.45
Traction	1.60
(All per 2000 lbs.)	
San Francisco, Cal.—Glass and roofing	3.00@3.50
Core, molding fine and brass	2.30@2.60
Furnace lining and molding coarse	3.60@4.25
Coarse core sand	3.60@4.25
Sand blast	2.30@3.60
Stone sawing and traction	2.30
Thayer, Pa.—Traction	1.50
Furnace lining	1.25
Molding fine and coarse	1.25
Core—green	1.65
Utica, Pa.—Core	1.25@2.25
Molding fine and coarse, traction, brass molding	2.00
Warwick, O.—Core, furnace lining, molding fine and coarse (damp, 1.75) dry	2.25
Traction, brass molding (dry)	2.25
Williamstown Junction, N. J.—Glass sand	**2.80@2.90**
Core, wet	**2.50@2.60**
Zanesville, Ohio—Molding fine and coarse, brass molding	1.50@2.00

Talc

Prices given are per ton f. o. b. (in carload lots only) producing plant, or nearest shipping point.

Baltimore, Md.—Crude talc	**4.00**
Cubes	45.00
Blanks, per lb.	.02
Chatsworth, Ga.—Crude talc	**8.00@10.00**
Ground talc (150-200 mesh), bags	**12.50**
Pencils and steel workers' crayons, per gross	**1.50@ 2.00**
Chester, Vt.—Ground talc (150-200 mesh)	9.00@10.50
(In Kraft paper bags. $1.00 per ton less in burlap bags, plus 15c for each bag.)	
Emeryville, N. Y.—150-200 mesh; bags	14.00
Glendale, Calif.—Ground talc (150-200-mesh	16.00@30.00
(Bags extra)	
Ground Talc (50-300 mesh)	13.50@15.50
Gouverneur, N. Y.—Ground talc (150-200 mesh)	13.50@14.50
Henry, Va.—Crude talc (lump mine run), per 2000-lb. ton	2.75@ 3.50
Ground talc (20-50 mesh), bags, 5.75@8.00; (200-350 mesh) bags	9.25@13.00
Johnson, Vt.—Ground talc (20-50 mesh), bulk	**8.00**
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@15.00
(Bags extra)	
Los Angeles, Calif.—Crude talc, f. o. b. mine	10.00
Ground talc (150-200 mesh)	20.00
Silver talc dust (600-mesh)	50.00
Natural Bridge, N. Y.—Ground talc (150-200 mesh) bags	12.00@13.00
Rochester and East Granville, Vt.—Ground talc (20-50 mesh), bulk	8.50@10.00
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@22.00
(Bags extra)	
Vermont—Ground talc (20-50 mesh); bags	8.00@10.00
Ground talc (150-200 mesh); bags	9.00@16.00
Waterbury, Vt.—Ground talc (20-50 mesh), bulk	8.50
(Bags $1.00 extra)	
Ground talc (150-200 mesh), bulk	10.00@15.00
(Bags 1.00 extra)	
Pencils and steel workers' crayons, per gross	1.20@ 2.00

Rock Phosphate

Raw Rock

Per 2240-lb. Ton	
Centerville, Tenn—B.P.L. 72% to 75%	**6.00@8.50**
B.P.L. 65%	6.00
Gordonsburg, Tenn.—B.P.L. 68%@72%	5.00@6.50
Mt. Pleasant, Tenn—Analysis, .70 B.P.L. (2000 lbs.)	**7.50**
Montpelier, Idaho—70% B.P.L.—Crude	5.00
Crushed 2-in. ring and dried	6.00
Paris, Idaho.—2,000 lb. mine run, B.P.L. 70%	**4.00**

(Continued on next page)

Agricultural Limestone

(Continued from preceding page.)

Whitehill, Ill. — Analysis, 97.12% $CaCO_3$, 2.50% $MgCO_3$ — 90% thru 100 mesh 5.00
50% thru 100 mesh 1.50
Yellow Springs, Ohio—Aanlysis 96.08% $CaCO_3$, 63% $MgCO_3$, 32% thru 100 mesh; 95.57%, sacked, 6.00; bulk.... 4.25
SOUTHERN:
Barber, Va.—Analysis, 92 to 98% $CaCO_3$—Bags, 6.50; bulk..... 4.50
Blowers, Fla.—Analysis, 98% combined carbonates—75% thru 200 mesh..... 4.75
Cartersville, Ga.—Analysis, 96% combined carbonates — pulverized limestone ..... 1.75@2.00
Claremont, Va. (Marlime) — Analysis, 90% $CaCO_3$, 2% $MgCO_3$—(90% thru 100 mesh, $4.00), 50% thru 100 mesh 3.50
Dittlinger, Tex. — Analysis, 99.09% $CaCO_3$, .04% $MgCO_3$—90% thru 100 mesh ..... 2.00@3.00
90% thru 4 mesh ..... 1.00@2.00
Ft. Springs, W. Va.—50% thru 100 mesh 3.00
Grovania, Ga.—Analysis, 95% $CaCO_3$, no $MgCO_3$—50% thru 100 mesh..... 2.50
Knoxville, Tenn.—Pulverized 2.50
90% thru 100 mesh..... 2.00
90% thru 50 mesh..... 1.50
Ladds, Ga.—50% thru 100 mesh..... 2.00
Linnville Falls, N. C.—Analysis,, 53% $CaCO_3$; 42% $MgCO_3$—50% thru 100 mesh; sacks, 4.50; bulk..... 3.00
Mascot, Tenn.—Analysis 52% $CaCO_3$, 38% $MgCO_3$.
80% thru 100 mesh..... 3.00
All thru 10 mesh..... 2.50
80% thru 200 mesh..... 4.50
Paper bags, $1.50 extra per ton; burlap, $1.00 extra per ton.
Maxwell, Va. 2.50
Ocala, Fla. — Analysis, 98% $CaCO_3$—75% thru 200 mesh..... 4.50
WESTERN:
Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all to pass 14 mesh; bags, 6.50; bulk 4.50
Sacks, 15c extra, returnable.
Garnett, Okla.—Analysis, 86% $CaCO_3$, 50% thru 4 mesh ..... .50
Kansas City, Mo., Corrigan Sid'g—50% thru 100 mesh; bulk..... 1.80
Terminus, Calif. — Analysis, 96.2% $CaCO_3$, .04% $MgCO_3$—60% thru 200 mesh, 90% thru 100 mesh, 95% thru 50 mesh, 100% thru 4 mesh; sacks, 6.00; bulk 5.25
Tulsa, Okla.—90% thru 4 mesh..... .50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

GLASS SAND:
Baltimore, Md. ..... 2.25@2.75
Berkley Springs, W. Va..... 2.00@2.25
Cedarville and South Vineland, N. J. (damp) 1.75
Cheshire, Mass. ..... 5.00@7.00
Hancock, Md.—Damp ..... 2.50@3.50
Klondike and Pacific, Mo..... 2.00@2.50
Mapleton, Pa.—Dry 2.50
Damp 2.00
Massillon, Ohio 3.00
Millington, Ill. 1.75
Mineral Ridge, Ohio ..... 2.50@2.75
Montoursville, Pa.—Green, washed..... 1.40@1.75
Oregon, Ill.—Large contracts..... 1.75
Ottawa, Ill. ..... 1.25@2.25
Pittsburgh, Pa.—Dry, 4.00; damp..... 3.00
Rockwood, Mich. ..... 3.00@3.50
Round Top, Md.—(washed-screened).... 1.25
St. Mary's, Pa.—Unwashed..... 2.25
Thayers, Pa.—Washed 2.00
Utica, Ill. ..... 1.25@1.75
Zanesville, Ohio 2.50
FOUNDRY SAND:
Albany, N. Y.—Sand blast..... 4.50@7.00
Molding fine, coarse and brass..... 1.75@2.00
Allentown, Pa.—Molding coarse & fine 1.50@1.75
Arenzville, Ill.—Molding fine..... 1.40@1.60
Beach City, O. — Core, washed and screened ..... 2.00@2.50
Furnace lining ..... 2.50@3.00
Molding fine and coarse..... 2.25@2.50
Bowmantown, Pa.—Core ..... 1.35@1.50
Molding, coarse ..... 1.80@2.00
Cleveland, O.—Molding coarse..... 1.50@2.00
Brass molding ..... 1.50@2.00
Molding fine ..... 1.50@2.25
Core ..... 1.25@1.50
Columbus, O.—Core ..... .40@1.25
Sand blast ..... 3.50@4.50
Furnace Lining 2.00
Molding fine ..... 1.50@2.25
Molding coarse ..... 1.50@2.25
Stone sawing 1.50
Traction ..... .40@ .75
Brass molding 2.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	**.75**	**.75**	**.75**	**1.00**	**1.00**	**1.00**
Buffalo, N. Y.	1.10	.95				
Erie, Pa.		1.00		1.15		1.25
Farmingdale, N. J.	.48	.48	1.50	1.50	1.30	1.30
Hartford, Conn.	.90		1.25	1.15	1.15	1.15
Leeds Junction, Me.		.50	1.75	1.50	1.35	1.25
Ludlow, Mass.	.75•	.75•	1.70		1.50•	1.50•
Philadelphia, Pa.	.75	.75		1.40	1.25	
Pittsburgh, Pa.		1.30	1.30	1.30	.85	.85
Portland, Maine		.50	1.75		1.35	1.35
Texas, Md.		1.00		Pure white sand, 1.50		
Washington, D. C.	.60@ .75	.60@ .75	2.00	1.40	1.20	1.20
CENTRAL:						
Alton, Ill.		.85				
Anson, Wis.	.40	.40@ .50		.90		.90
Attica and Covington, Ind.	.90	.90	.90	1.00	1.00	1.00
Barton, Wis.		.60	.70	.70	.70	.70
Beloit, Wis.		.40	.40		.40	
Chicago, Ill.		1.75@2.23	1.75@2.43			
Cincinnati, Ohio	.70	.65	.90	.90	.90	.90
Columbus, Ohio	.90@1.75	.90@1.25	.85@1.25	.90@1.25	.90@1.25	.90@1.25
Des Moines, Ia.		.40@ .65	1.60	1.60	1.60	1.60
Detroit, Mich.	.65	.65	.95	.95	.95	.95
Earlestead (Flint), Mich.	.70	60-40 sieves, .85; Pebbles, .95				
Eau Claire, Wis.	.50	.50	1.00@1.25	1.00	1.00	
Elgin, Ill.		.80	1.00	.80	.80	.80
Elkhart Lake, Wis.	.70	.58	.90	.90	.72	.72
Ft. Dodge, Ia.		1.22		2.17		
Grand Rapids, Mich.		.50		.85	.75	.75
Greenville, Mechanicsburg, O.	.80	.70	.80	1.00	.85	.80
Hawarden, Ia.	.70	.50		1.60		1.40
Indianapolis, Ind.	.60	.60		1.50	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Le Mars. and Doon, Ia.		.90		1.80		
Libertyville, Ill.		.70		.70	.70	
Mankato, Minn.	.50	.50	.75@1.50	.75@1.50	.75@1.50	.75@1.50
Mason City, Ia.	.90	.80	1.90	1.80	1.70	1.65
Milwaukee, Wis.	1.15	1.15	1.25	1.25	1.25	1.25
Minneapolis, Minn.	.35@ .50	.35@ .50	1.50	1.50	1.50	1.25@1.50
Moline, Ill	.50@ .70	.50@ .70	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Riton, Wis.		.40			.50	.50
St. Louis, Mo., f. o. b. cars....	1.35	1.75	1.50	1.30	1.30	1.25
St. Louis, Mo., delivered on job ..	2.05	2.20	2.35	2.15		2.10
Summit Grove, Clinton, Ind.....	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.75	.75	.75	.75	.75
Winona, Minn.	.60	.50	1.50	1.25	1.25	1.25
Yorkville, Moronts, Oregon and Sheridan, Ill.		.60@ .80	.70@ .80	.70@ .80	.70@ .80	.60@ .80
SOUTHERN:						
Alexandria, La.	.60@ .80					1.20@1.50
Birmingham, Ala.	1.48	all gravel—1.88				
Charleston, W. Va.		(Sand, 1.40@1.50; gravel, 1.50				
Estelle Springs, Tenn.	1.25	1.25	1.10	1.00	.90	.85
Ft. Worth, Tex.		2.00		2.00		2.00
Jackson's Lake, Ala.	.50@ .60	.50@ .60	.40@1.00	1.00	.50@1.00	.50@1.00
Knoxville, Tenn.	1.15	1.15	2.12		1.92	1.74
Lake Weir, Fla.		.75				
Macon, Ga.		.50@ .75				
Memphis, Tenn.	1.12	1.12				1.95
N. Martinsville, W. Va.	1.10	1.10		1.30		.90
New Orleans, La.	.50			.85	.85	
Pine Bluff, Ark.	1.00@1.25	.80@1.05	Washed gravel, all sizes, 2.20			
Roseland, La.	.25		1.00	1.00		
WESTERN:						
Grand Rapids, Wyo.	.50	.50	.85	.85	.80	.80
Kansas City, Mo.	(Kaw River sand, car lots, .75 per ton, Missouri River, .85)					
Niles, Calif.	1.00	1.00	1.40	1.00	1.00	1.00
Pueblo, Colo.	1.10•	1.00•			1.50•	
San Diego, Calif.	.80@1.00	.80@1.00	1.30@1.60	1.25@1.55	1.15@1.45	1.10@1.40
San Francisco, Calif.		1.00	1.00@1.20	.85@1.00	.85@1.00	.85@1.00
Seattle, Wash.	1.50•	1.50•	2.00•	1.50•		1.50•

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
Attica, Covington, Silverwood, Ind., and Palestine, Ill.	.75	.75	.75	.75	.75	.75
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Cape Girardeau, Mo.			River sand, 1.00 per yd.			
Cherokee, Ia.			.80 per ton—1.20 washed			
Detroit, Mich.	1.10•					
Dudley, Ky. (Crushed Sand)..		1.05		1.00		
East Hartford, Conn.			.65 per cu. yd.			
Elkhart Lake, Wis.			Washed gravel .66			
Estelle Springs, Tenn.						.85
Fishers, N. Y.	.60	.65		.60		.50
Glenville, N. Y.				1.00•		
Hamilton, O.			.30 per cu. yd. in pit			
Hartford Conn.		1.00•				
Hersey, Mich.	.30	.50		.50	.85	.60
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Janesville, Wis.		.65			.65@ .75	
Lindsay, Tex.		2.00				.60
Oxford, Mich.				.65	.65	
Pine Bluff, Ark.			Road gravel .60			
Rochester, N. Y.	.60@ .75	.60@ .75			.50@ .65	.50@ .65
Roseland, La.		.75				
Saginaw, Mich., f. o. b. cars....		.75	1.30	1.30	1.30	1.30
St. Louis, Mo.			60% gravel, 40% sand, 1.50			
Summit Grove, Ind.	.60	.60	.60	.60	.60	.60
Waco, Texas		.80		1.50		1.30
Winona, Minn.			.70	.70	.70	.70
Yardville, N. J.		.50@ .75				
York, Pa.	1.05	1.20		(crushed rock sand)		

•Cubic yard. B Bank. L Lake. || Ballast.

News

Cement Factory Project in Jamaica

THE government of Jamaica has been considering the feasibility of establishing a cement factory, and, according to a report from Consul Charles L. Latham at Kingston, experts from England have been employed to make preliminary investigations. These experts have now given their report, extracts of which are available.

American business men interested in the project may obtain a copy of the report from the Latin American division of the Bureau of Foreign and Domestic Commerce by referring to file No. 37946.

Missouri to Check Up Its Sand Companies

A CHECK-UP on the Missouri companies using sand and gravel from the beds of navigable streams is being made by Attorney General Utley with a view of forcing them to make the regular monthly settlements with the state and also obtain their permits according to law.

Missouri is entitled, according to the attorney general, to a fee of 2½ cents per cu. yd. for all the sand and gravel removed from the beds of navigable streams. One exception to this law, the attorney general said, is that no charges are made for sand and gravel moved for construction of roads.

International Cement Sales Grow

FOR the nine months ended September 30, the International Cement Corporation report gross sales of $8,738,769, which is $276,973 in excess of the total for the full year 1920. Gross sales for the quarter ended September 30 amounted to $3,324,501. The balance for dividends for the quarter was $420,792, and for the nine months $1,268,617. The balance for the nine months was equal to $3.83 a share on the 323,573 shares outstanding.

Alsen Cement Plant to Open Next Spring

PLANS of the Alsen Cement Corporation, Catskill, N. Y., have resulted in the purchase of the Alsen plant and the Marlborough Sand and Gravel Co. by a company headed by M. J. Fallon. Ellis Soper of Chattanooga, enn., will have charge of the improvements as general superintendent and engineer. The plant, after extensive changes in buildings and equipment, will open next spring.

The Rosoff Engineering Co., holding a part interest in the Alsen cement plant, will retain charge of the sand and gravel company, with Morton Jenkins in charge of plant operation.

Millions Freed for Roads

MORE THAN $150,000,000 will be available for highway construction in the next seven or eight months, for the Townsend highway bill has been signed by President Harding. The federal appropriation of $75,000,000 is matched by an equal amount from the states.

It is said that over 275,000 men will be given employment—in line with the President's recommendations made at the recent Conference on Unemployment. If the delay had continued much longer, Minnesota alone would have been compelled to abandon all plans for winter construction and discharge 1200 road patrolmen.

Division of this appropriation calls for the spending of about $57 of state money to the federal government's $43. Under this enactment, all federal-aid roads must be kept in good condition at all times; violation of this provision deprives the state of federal aid, the Secretary of Agriculture orders the repairs made and the negligent state pays the bill.

As showing the magnitude of the work, if the federal-aid roads completed and to be let under this new fund were placed end to end, they would span the earth and go from New York to San Francisco for good measure.

The average cost of completed federal-aid roads has been between $17,000 and $18,000, while hard surfaced roads have taken more than one-half the money spent, a great mileage of the gravel and sand-clay roads have been built where adapted to traffic.

Some of the state allotments are as follows: Texas, $4,425,172; New York, $3,696,447; Pennsylvania, $3,398,943; Illinois, $3,246,281; California, Iowa, Kansas, Michigan, Minnesota, Missouri and Ohio, in excess of $2,000,000 each; Virginia, $1,456,828; West Virginia, $802,059; Maryland, $640,629; Rhode Island, Delaware, Vermont and New Hampshire, $356,625 each.

Municipal Quarries Must Install Safety Devices

MANITOWOC, a Wisconsin city operating two municipal quarries, will be required to provide safety devices for the protection of employes as a result of action by the State Industrial Commission.

The commission has issued a call for public hearing in November on a proposed safety code for quarries.

Activity in Pittsburgh Sand Business

ACTIVITY in the sand and gravel business around Pittsburgh is reflected in the report of the Rodgers Sand Co. that all of their eight boats are in constant service—in fact, a night and day shift is maintained. The demand for immediate deliveries has encouraged the sand companies to do everything to comply with the desire of builders to get as many houses as possible on the market for the spring demand.

Japanese Interest in Idaho Phosphate Rock

JAPANESE FINANCIERS, after the slump in interest a year ago in the movement of phosphate rock from Idaho, through Portland to Japan, are again making inquiries for the movement of some 100,000 tons.

According to General Traffic Manager Hudson, at Portland, the indications are good for a Japanese demand for phosphate work. Adequate facilities for handling this traffic are ordered for municipal terminal No. 4.

Missouri Will Ask I. C. C. for Rehearing on Rates

THE present public service body will file a motion for rehearing of the ruling by the former Missouri public service commission ordering the freight rates on stone and similar commodities advanced to the level of the interstate rates with the Interstate Commerce Commission.

Commissioner McIndoe is preparing figures to submit with the motion. It will be several days before the motion is ready to forward to Washington.

News—Continued

New Vice-President of Randolph-Perkins Co.

AS ANNOUNCED in ROCK PRODUCTS for November 5, George B. Massey has joined forces with the Randolph-Perkins Co., engineers and managers, of Chicago. A biographical sketch of Mr. Massey reveals that he was born in Cleveland, Ohio, in 1875; was graduated from Sheffield Scientific School in 1895 with high honors and went to Mexico as a member of the engineering staff of the Mexican International Railway. When the Spanish-American War broke out he entered the United States Navy as an engineer officer and served with the fleet off Santiago.

After the war Mr. Massey went with the Bucyrus company at South Milwaukee, where he gained an extensive experience in design, production and sales of excavating and earth-handling machinery. While with this company he visited the European countries and established agencies there.

In 1915 Mr. Massey formed the George B. Massey Co., Chicago, consulting engineers in excavating machinery and methods. In 1917 he again entered the navy and was assigned to duty as engineer officer at the Great Lakes Training Station at Lake Bluff; afterward at a naval base in Scotland as engineer officer for the North Sea mine barrage. Here he designed several improvements in mine operating mechanisms which were put to use.

Returning to private life he continued his consulting practice under his own name until September, 1921, when he consolidated his company with the present company, of which he is the vice-president.

Mr. Massey is at present in India, where he is doing consulting work, together with a survey of trade opportunities. He is thoroughly equipped by knowledge and experience to efficiently handle all problems of excavation, including ditches and canals for land drainage, levees and dams for flood protection and river control, stripping for mining of phosphate, gypsum, fire clay, marl, bauxite, phosphate, gravel, sand, coal, etc.

Indiana Sand and Gravel Producers' Convention

The next annual convention of the Indiana Sand and Gravel Producers' Association will take place on January 10 and 11, 1922, at Indianapolis, Ind. Mark these dates on your calendar.

Brazilian Cement Imports

IMPORTS OF CEMENT to Brazil for the first four months of 1921 amounted to 52,605 metric tons, of which Germany furnished 17,995 tons, United Kingdom 12,884 tons, Belgium 6,383 tons, and the United States only 6,127 tons. The c.i.f. values of the German product had the advantage in every case, according to a report of Consul C. R. Cameron.

In comparison with American values, German cement had an advantage of 20.7 per cent, with the United Kingdom 25.1 per cent, and with Belgium 5.9 per cent.

National Good Roads Show

CLOSE to $1,500,000 worth of labor-saving machinery, appliances, materials and transport equipment will be exhibited at the show held in conjunction with the meeting of the American Road Builders' Association in Chicago on January 17-20.

George B. Massey, vice-president of the Randolph-Perkins Co.

It is said that more than $100,000,000 worth of road machinery is being manufactured annually. The manufacturing exhibitors will have special representatives to meet the visitors.

Switching Charges on Sand Unreasonable

SWITCHING CHARGES on sand within the limits of Memphis—increased up to 500 per cent by General Order 28—have been condemned in a report on No. 11,280, Missouri Portland Cement Co. vs. Director-General, as agent, opinion No. 7212, 64 I. C. C. 243-7. The report says the charges were unreasonable because they exceeded $5 per car, which rate was established on December 30, 1918. Reparation is to be made to that basis.

The report was written by Commissioner Eastman. He proceeded on the assumption that haul involved was a switching service. It was performed by yard crews. In June, 1918, 203 cars were handled. That month's traffic was treated by Commissioner Eastman as typical.

In November, 1918, the rate was reduced to $6.50 and a month later it was brought to the point to which the Director-General is to make reparation.

Solvay Process Co. Changes

CHANGES are in line in the Solvay Process Co. plants at Syracuse, N. Y., to reduce overhead and trim down a big organization created by war needs to present demands. The retirement of these officials were confirmed recently:

Livingston M. Whitwell, for 21 years with the Semet-Solvay plant and for years a vice-president, resigns the latter office. The duties of the several vice-presidential positions left open by changes will be filled by P. K. Malin, formerly president of the Kentucky Solvay Coke Co.

Duties of chief engineer of the Solvay and Semet-Solvay plants are consolidated and will be handled by A. T. Leavitt, chief engineer of the latter. Charles K. Mallory, latterly chief engineer of Solvay, will retire. A. D. Allibone, general auditor of Solvay, Semet-Solvay and subsidiaries, and M. D. Whitford, treasurer of Semet-Solvay and many of its branches, will also retire.

Men who have closely observed developments at the big Syracuse plants during the past five years claim readjustment of affairs of the corporations was inevitable, even though neither Solvay nor Semet-Solvay had become constituent parts of the Allied Chemical and Dye Corporation. There was a great increase in overhead, together with a tremendous increase in business. When business dropped, the companies began to effect economies in production and increase efficiency in operation and management.

Retrenchment is still going on in all the plants. The Solvay companies have spared no effort to get back to a normal basis and their work is a sample of what must take place throughout the rock products industry. It is a good sign that it is being accomplished in a majority of instances.

News of All the Industry

Incorporations

The Consolidated Marble Corporation, St. Louis, Mo., has been incorporated for $300,000.

The Thermo Wall Concrete Construction Co., Portland, Ore., has been incorporated for $25,000.

The Svoboda Granite Corporation, Omaha, Neb., has been incorporated for $500,000 by Frank Svoboda and others.

The Three Rivers Construction Co., Ltd., Three Rivers, Que., has been incorporated for $40,000 to manufacture cement, plaster, stone, etc.

The Sioux Falls Sand Co., Sioux Falls, Ida., has been incorporated for $100,000 by Delbert Wheeler, Eva Wheeler and J. E. Harrington.

The Green Rood Stone and Supply Co., South Euclid, Ohio, has been incorporated for $250,000 by Perry P. Quayle and C. C. Cooper.

The Builders Supply Co., Mexia, Tex., has been incorporated for $20,000, by R. S. Albaugh, A. B. Stringer and Mrs. R. B. Albaugh.

The S. H. Bowman Co., Minneapolis, Minn., has been incorporated for $1,000,000; will operate retail yards for building materials and fuel.

The Mikelson Cement Products Co., Albert Lea, Minn., has been incorporated for $50,000 by John Mikelson, Niels Nielson, Adolph Moehring.

The Bromide White Lime Co., Bromide, Okla., has been incorporated for $100,000 by Fred Barrett, Clarence L. Rallsback, Dayton F. Kelpinger.

The Badger Lumber & Supply Corporation, St. Francis, Wis., has been incorporated for $100,000, and will engage in the building material business.

The Henry Cook Co., Milwaukee, Wis., has been incorporated for $50,000 by Henry Cook, Jr., John W. Cook, and George J. Cook to wholesale building materials.

The Perry Granite Corporation, Waterbury, Vt., has been incorporated for $100,000 by William H. B. Perry, Margaret S. Perry, Robert B. Perry, Charles C. Graves, Minnie A. Quinn.

The Las Vegas Sand & Gravel Co., Las Vegas, N. M., has been incorporated for $25,000 by E. T. Springer, Cimarron, N. M., J. Collier, Denver, Colo., Col. C. Iden, and C. Rosenwald of East Las Vegas.

John G. Jonsen, Inc., Milwaukee, Wis., has been incorporated for $40,000 to do general construction work and deal in building materials by John G. Jonsen, Adelaide Jonsen and Joseph P. Jonsen, all of Milwaukee.

Lime

The Pacific Lime and Plaster Co., Standard, Calif., is now operating nine large kilns. The factory has an order for 1400 bbls. of acme and 1300 cans of dolomite.

The Bessemer Limestone and Cement Co., Harrisburg, Pa., has filed a claim for $5,000 reparation on alleged unjust rates charged by the Pittsburgh, Lisbon, and the Pennsylvania railroads.

The Vulcan Iron Works, Wilkes-Barre, Pa., have recently published a booklet on "Lime-Burning in the Rotary Kiln," which sets forth the advantage of this type of kiln. There is also interesting data on limestone and lime, types of kilns, rotary coolers, capacities and cement, chemical and metallurgical equipment.

The Kelly Island Lime & Transport Co., Kelly Island, Ohio, in a change of management, has given Mr. Deringer, formerly superintendent of the plant on Kelly Island charge of the quarries, kilns, crushers and other departments of the Marblehead plant. Work is to be resumed at the plant and an effort will be made to keep it running all winter.

Gypsum

The Southern Gypsum Co., North Holston, Va., is planning for the installation of new crushing machinery and other equipment at its plant.

Feldspar

The Mineral Potash Corporation, 712 Equitable Building, Baltimore, Md., will establish a plant in Howard County, Md., and install $50,000 worth of machinery to grind feldspar.

Quarries

The Susquehanna Stone Company, Dalmatia, Pa., plans to rebuild a portion of its stone-crushing plant.

The Jackson Marble & Granite Works, Jackson, Tenn., W. M. Arnold, superintendent and manager, is establishing a plant on Neely street.

The Georgia Marble Co., Tate, Ga., Sam Tate president, will erect a building 368x168 and install 30 gangs of saws, nine rubbing beds, polishing machines and lathes, all to be electrically driven. It is equipped with the latest machinery and can supply crushed rock for road or concrete work and pulverized limestone for agricultural purposes. The company is already supplying road building material.

Clarendon, Tex.—J. B. McCarley is opening a marble business here. A new building for the marble business is being erected in the business section. There are two other houses in West Texas, one at Lubbock and the other at Plainview.

Marquette, Mich.—In the interests of its municipal rock crushing plant and quarry, the City Commission has instructed G. S. Webb, commissioner of public works, to prepare a report on street work for the next year and an estimate of the amount of rock required. It was also voted to have an engineer make an inspection of the quarry sites near the city.

C. E. Champie, Escondido, Calif., is forming a company to quarry granite on his ranch a mile west of the Santa Fe depot. He will go ahead with the project as soon as his application is approved by the state officials. The rock will be quarried and sent in the rough to coast cities. Besides quarrying the product at the local plant the waste and refuse will be crushed into facing material for paving, etc.

The New Jamestown Quarry Co., located near Spanish Lakes, St. Louis County, Missouri, recently celebrated the opening of its plant. This is an incorporated organization of farmers controlled by a board of seven directors and at present has about 60 stockholders. More than 200 farmers inspected the new plant and saw the method by which limestone rock is reduced to powder for agricultural purposes. Short talks were given on the need and value of lime on sour soils.

The Shea & Donnelly Co., a stone firm of Bedford, Ind., had a temporary injunction issued by Judge Anderson in Federal Court at Indianapolis against 36 members of the Journeymen's Stone Cutters' Association of North America, prohibiting them from interfering with transportation in interstate commerce of products of the Shea & Donnelly Co. The injunction also prohibits interference with the carrying out of contracts for transportation of stone in interstate commerce, and use of violence or threats of injury with non-union employes of the company, as well as from distributing statements that the company is unfair and should not be patronized. The order is to continue in effect until further orders from the Federal Court.

Cement

The Cumberland Cement & Supply Co., Cumberland, Md., has increased its capital stock from $10,000 to $260,000.

The International Cement Co. is excavating for a $200,000 warehouse in Hudson, N. Y. J. Andrews is assistant superintendent, on the premises.

The Bessemer Limestone and Cement Co., Harrisburg, Pa., has filed claim for $5,000 reparation on alleged unjust coal rates charged by the Pittsburgh, Lisbon and Western and the Pennsylvania railroads.

The Nebraska Cement plant at Superior, Neb., resumed work after a two months' shutdown. Nearly all of the 100,000 bbls. of cement stored for the past two months has been sold. During the past month business was considerably greater than it was a year ago.

The Peninsular Portland Cement Co., Cement City, Mich., has started proceedings in the Lenawee circuit court against the Jeffrey Manufacturing Co. of Columbus. The declaration of the plaintiff sets forth that the terms of a certain agreement between the parties was violated by the defendant.

The Midwest Construction Co., Chicago, only recently organized, has sold this year nearly $100,000 worth of products. Culverts made by the company can be found in nearly every county in western Nebraska, although the heaviest sales have been south of the Platte. The shipments are at the rate of about 80 cars per year.

The Castalia Portland Cement Co., Pittsburgh, Pa., through its board of directors, that this company is no longer in the hands of a receiver. The officers and directors for the coming year are the following: G. W. Hackett, president; J. Twing Brooks, vice president and treasurer; E. M. Humes, secretary. Directors, J. D. Rhodes, George P. Rhodes, J. Twing Brooks, W. S. Kirkpatrick, John T. Wilson, H. H. Brown, G. W. Hackett.

Concrete, Wash.—The Superior Portland Cement Co. has installed a big siren at its quarry as a warning to people when blasting is about to start. The siren will sound for three minutes before the blasting starts and will continue to sound until the last shot has been fired. The siren can be heard for a long distance and can not be mistaken for some other whistle. The railroad leading past the quarry is much traveled and there has always been danger that persons passing the quarry might be hit by a flying rock from an unexpected blast.

Concrete Products

The Conti-Augustine Co., Tom River, N. J., newly organized to manufacture cement block, have opened a plant in Berkeley and installed new machinery and molds.

The Granite Stucco Co., Newark, N. J., has leased 4000 sq. ft. of floor space in the Ballantine building, on Christie street, for manufacturing a magnesite stucco for use in extension construction.

The Vicama Mica Co., 3 Hamilton Row, Hagerstown, Md., is planning for the installation of new equipment at its properties in Virginia, including crushing and pulverizing machinery and general quarrying equipment.

Manufacturers

The Quaker City Rubber Co., Philadelphia, announces its removal to its new building at 624-28 Market street.

The Pennsylvania Glass Sand Co., Pittsburgh, Pa., has filed application with Superintendent of Building Fennell for permit to erect a $10,000 grinding mill at Lincoln Park. It will be of one-story, 50x100-ft. in ground dimensions. The present application covers the foundation only.

The Insley Manufacturing Co., Indianapolis, Ind., has just issued catalog No. 43, dealing with the Insley line of steel derricks. The catalog goes into details in the description of the company's derrick and also contains considerable valuable engineering information. The catalog should be in the hands of all rock product producers.

The Ransome Concrete Machinery Co., Dunellen, N. J., will build an addition to their present plant which will increase their manufacturing space 54 per cent. The new building, 53 by 320 ft. will contain huge electric cranes, running the entire length of the factory and capable of handling any but the very largest concrete mixers made by the company. The machine shop and erecting floors will be equipped with the most modern machinery, including portable air and

electric equipment, which will greatly facilitate production in the plant.

The Bucyrus Co. has removed its New York office to suite 728, 30 Church street, with E. G. Lewis as Eastern sales manager. M. J. Woodhull is appointed central sales manager, to succeed Mr. Lewis in charge of the Chicago office, 622 McCormick building. E. E. Weber has been made Northern sales manager at Minneapolis, 1224 Knight building, to succeed J. N. Gawthrop, who will be associated with Mr. Lewis in New York. Mr. Weber has been with the Bucyrus Co. for the past 15 years.

Sand and Gravel

W. E. Rogers, Tulsa, Okla., has purchased the entire interest of the Arkansas River Sand Co.

C. Copeland, Cordel, Okla., wants prices in carload lots of sand and gravel delivered in Dill, Okla.

Portland, Ore.—The sand and gravel dock and bins of D. C. O'Reilley are to be reconstructed and new equipment installed.

The Escambia Sand and Gravel Corporation, Flomaton, Ala., of which C. H. Harrell is vice-president, will install a dredging plant.

The Interlachen Sand & Gravel Co., recently incorporated in Interlachen, Fla., has elected George E. Welch, president, and J. H. Wylie, secretary and manager. The plant will have a daily output of 500 yards of sand and gravel.

The Belford Nugent Sand and Gravel Co., Evansville, Ind., will open an addition to its plant at Rockport. Owing to the large territory covered by the company, it is necessary to establish a new receiving and shipping point and, as the company is getting the bulk of its product there, Rockport is the most feasible place to build. Building operations will probably be started about January.

Gypsum, Alaska—The Pacific Coast Gypsum Co., from its mine is producing and shipping an average of 2,000 tons of gypsum each month. At the present time the product is shipped to the plant at Tacoma by barges. During the coming winter the Canadian Pacific freighter Princess Ena will handle it. The gypsum is mined and shipped without any reduction to the company's plant at Tacoma from which place it is shipped all over the country.

Indianapolis—Petitions in bankruptcy have been filed in the Federal Court by the Capital City Gravel Co., the J. F. King Coal Sales Co. and the Luhrug Collieries Co., against the Louis Eilering Co., and by the Indianapolis Mortar and Fuel Co., and the Cochran Coal Co., against Louis Eilering personally. It is charged in each petition that Eilering committeed an act of bankruptcy September 30 by executing a mortgage to the Indianapolis Finance Co. to secure an indebtedness of $13,857. The petitions against the Louis Eilering Co. hold claims aggregating $900, and those against Mr. Eilering personally $1,900.

The Rock Point Sand Co. has opened a branch office in Youngstown, Ohio. The company produces sand for all purposes, gravel, stone for road construction and for building. Among its sand products are concrete sand, brick sand, mason sand, plasterers' sand, high-grade silica sand, open hearth silica sand, molding sand, locomotive sand, hot blast sand, asphalt and grouting sands. The company operating under Government supervision, has dredged a channel in the Beaver River nine miles long that would handle a lake vessel of 24-ft. draft. The plant at West Ellwood Junction has a capacity for handling 1,000,000 tons of sand and gravel a year and up to 500,000 tons of silica sand and building stone. The latter is taken out of the bluffs along the river's edge.

Personal

F. V. Shannon, vice-president of the Massey Concrete Products Corporation, Chicago, sailed for the Orient November 5 on the steamship Keystone, from Seattle, Wash.

Francis C. Welch of the Bureau of Standards has invented a process whereby the plasticity of masons' hydrate of lime can be improved. Mr. Welch will demonstrate this process to those interested at the bureau on December 14.

E. M. Confer, formerly superintendent of the Gulf States Portland Cement Co., has accepted the position of general manager of the Calera Development Co., Calera, Ala., manufacturers of hydrated lime and crushed stone. The company will build a 2000-bbl. cement plant in that city in the near future.

Peter C. Spence has been appointed manager of the construction department of the local headquarters of the National Lime Association. He will have supervision of the co-operative investigation of lime in construction uses, such as its effect on concrete, its fire resistance in plaster, the composition of lime plaster for special uses, acoustic properties of lime plaster, etc. He will co-operate with the Bureau of Standards in this connection, it is announced. Mr. Spence is a graduate in science and civil engineering of New York University.

Obituary

William C. Cartwright, 67 years old, secretary-treasurer of the Midwest Crushed Stone Quarries, died recently at his home in Indianapolis, following an illness of five weeks with pneumonia. Since last spring Mr. Cartwright has been in ill health but had continued with his business until his last illness. A widow and three sons survive him.

Illinois Silica Sand Rate Case Dismissed

THE INTERSTATE COMMERCE Commission has dismissed No. 11753, Silica Sand Producers' Traffic Association of Illinois vs. C. B. & Q. et al., opinion No. 7091, 61 I. C. C. 217-9, holding that the applicable charges on a carload of silica sand from Oregon, Ill., to Healy, Ill., reconsigned to Gas City, Ind., in January, 1920, were not unreasonable or unduly prejudicial.

The case involved the rule that when a car is set for unloading at the original billed destination and is then reconsigned the full in and out rates plus a reconsignment charge shall be applied; and the question whether the combination from the point of origin to Healy, Ill., should be made by using the Chicago switching rate from Galewood to Healy, or the local distance rate of the Milwaukee. The carriers used the local distance rate of 3 cents from Oregon to Healy, and 50 cents the combination to have applied was 90 cents. The complainant contended for the use of a switching rate of $5.

Both contentions with regard to the movement between Galewood and Healy, the commission said, were wrong. It said beyond, modified by the rule for constructing combinations, the result being a combination of $1.20 per ton. The 3 cents per 100 local distance rate, the commission said, was not the proper factor to use. From Healy to Gas City it said the proper rate was a combination of $1.80. That combination was obtained by using a rate of 50 cents from Healy to Galewood and $1.50 beyond, modified by using the rule for constructing the combination, the result being $1.80 instead of $2. The result of the commission's figuring was a conclusion that the shipment had been undercharged $5.

In passing the commission said that the rule imposing the full locals to and from the reconsignment point, plus a reconsignment charge, was upheld by it in a number of cases, particularly in 59 I. C. C. 73, and that the record in this case did not warrant any other conclusion.

Complainant, according to the report, attacked the application of anything other than a switching charge from Galewood to Healy as unreasonable. It introduced an analysis of Chicago switching rates, and, according to the report, attacked the rates in the Chicago switching district and contended that the charges for team track delivery were unduly prejudicial against shippers taking team track delivery.

The connection between rates for team track delivery and industrial sidetrack delivery and the rates to and from Healy in this case is not made apparent by the report. The commission said, however, that the adjustment of rates in the Chicago switching district was too complex to be dealt with on the record in this case because the evidence of unreasonableness and undue prejudice was exceedingly meager.—*Traffic World.*

Railroad Executives Will Press Wage-Cut Action

SO THAT the 20 per cent increase put in effect during 1920 will be written off, the railroad executives of the Eastern railroads will try to secure from the Railroad Labor Board authorization for a further reduction in the pay of the operating employes. The 12 per cent cut ordered in July has written off part of that increase.

In a few days conferences with the employes will be had, and when a clear plan has been evolved it will be put before the Labor Board. As that body secured a recall of the strike order, scheduled to go into effect on November 1, on the basis of no further wage reductions being ordered, there is a doubt if any immediate action by the board will be forthcoming.

Plan Cut in Freight Rates in Central Territory

ACCORDING to information received from the National Association of Sand and Gravel Producers, the carriers in the Central Freight Association territory are planning to make a general reduction on road-making materials to 15 per cent below the rates in effect in August of last year, using the Michigan scale as a minimum. They propose to make the new rates effective November 15th.—*Illinois Concrete Aggregate Association Bulletin.*

Used Equipment

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

Machinery For Sale

DRYERS—Direct-heat rotary dryers, 3x25′, 3½ x25′, 4x30′, 5½x50′ 6x50′ and 7x60′; double shell dryers, 4x20′, 5x30′ and 6x35′; steam-heated air rotary dryers, 4x30′ and 6x30′.

KILNS—Rotary kilns, 3½x25′, 5x60′ and 6x70′, 6x100′, 7x80′ and 8x110′.

MILLS—6x8′, 6x5′, 2½x3″ 3x3½′ pebble and ball mills; 8x4′, 6x4′ and 4x4′ continuous ball mills; 3′ March mill; 42″, 33″ and 24″ Fuller-Lehigh mills; 4½x20′, 5x11′, 5x20′, 5½x22′ and 6x20′ tube mills; 7½x13″, 9x15″, 16x10″ and 30x60″ jaw crushers; one "Infant" No. 00, No. 0, No. 2, No. 3, and No. 9 Williams' swing hammer mills; one Kent type "G" mill; 36″ and 40″ cage mills; 3′ and 4½′ Hardinge mills; 18x12″, 20x12″ and 30x10″ roll crushers; No. 0, No. 1 and No. 3 Sturtevant rotary crushers; one No. 2 Sturtevant ring roll crusher; 3 roll and No. 000, No. 00 and No. 0 Raymond mills; one No. 5 Telsmith breaker; one 36″ Sturtevant emery mill; one 3 roll Griffin mill; 60″ chaser mill.

SPECIALS—Five automatic package weighing machines; jigs; one keystone excavator; 6x8′, 6x5′ and 4x3′ Newaygo vibrating screens, Richardson automatic scales.

Air compressors and tanks.

W. P. Heineken, Engineer
95 Liberty Street, New York. Tel. Cortland 1841

STEEL RAILS

We offer for immediate shipment the following choice lots of relaying steel rails:

3,000 tons 60 lb., with angles.

2,000 tons 56 lb., with angles.

Free delivery to any point on Illinois Central R. R., south of St. Louis; attractive prices also can be made to any contiguous territory or for export.

600 tons 35 lb., with angles, located at Red Lick, Miss. This rail is well situated for delivery to points in Alabama, Mississippi and Louisiana, or for export.

300 tons each 30 lb. and 35 lb., located Whelen Springs, Arkansas.

250 tons first-quality new 25 lb. billet steel rails, and fastenings, located Austin, Texas.

Terms will be made to responsible buyers. Address inquiries to

Shook & Fletcher Supply Co., Inc.
Birmingham, Ala., or
Birmingham Rail & Locomotive Co.
Birmingham, Ala.

New—RAILS—Relaying

All sections on hand for quick shipment. Reasonable prices quoted. Our stock is very complete.

M. K. FRANK
Frick Building Pittsburgh, Pa.

QUARRY EQUIPMENT

4—20 yd. Steel Underframe Side Dump Cars.
3—16 yd. Steel Underframe Western Dump Cars.
10—1½ yd. Western Dump Cars.
2—10x16 Davenport 36 in. ga. Saddle Tanks.
1—11x16 American 36 in. ga. Saddle Tank.
1—9x14 Porter 4 ft. 8½ in. ga. Saddle Tank.
1—⅝ yd. Thew "O" Traction Shovel.

Walter A. Zelnicker Supply Co., St. Louis

NO. 8-D, GATES GYRATORY CRUSHER

STANDARD DRIVE

Fitted with manganese head and concaves. Included with this crusher, we have the following extra spare parts:

1 New, Manganese head.
1 New, set of manganese concaves.
1 New, main shaft.
1 New, Spider, and 2 New, eccentrics.

We also have many other sizes and types. We specialize in good quarry equipment of all classes. Write us fully.

Reading Engineering Co., Inc.
1227 Tribune Bldg., New York, N. Y.

IMMEDIATE DELIVERY

Nos. 6, 7½, 9K & 18K CRUSHERS.
No. 10 McCULLY CRUSHER.
50-75 HP. single drum hoists, 25 Cy. Motors, 440 V. 3 Ph.
25-50-100 Kw. Eng. & Turbo sets, D. C. & A. C.
250-300-500 Kw. Turbo & Eng. Sets.
BELT & STEAM DRIVEN COMP. 50-500 ft.
2-6-12 Ton 24 in. Gauge Gasoline Locomotives.
6-8-10 in. Sand Pumps, belt and 6″ Eng. Drive.
25-40 HP. double drum Elec. Hoist, 440 V. 60 Cy. 3 Ph.
5-10-15 Ton Holt Tractors.
2—290 HP. NEW B&W 200 lb. boilers.
150 HP. 150 lb. H.R.T. Boiler—buttstrap. Indpls.
9K GATES REG. DRIVE, BARGAIN, $5000.00.

Send Us Your Inquiries, Centrif. Pumps, Motors, Compressors, Electrical Equipment, Etc.

Ross Power Equip. Co., Indianapolis, Ind.

FOR SALE

10″x14″ Vulcan 12-ton dinkey 36″ gauge.
Marion drag line excavator, 50′ boom, shop number 4058.
5 roller, high side Raymond pulverizer.
Williams swing hammer pulverizer, number D-43.
20 3-yard side dump 36″ gauge, Oliver tram cars.
14 1¼-yard, side dump, all steel, 36″ gauge tram cars.
12 1-yard, side dump, all steel 36″ gauge tram cars.
2 American process dryers, 24′ long by 48″ diam., sprocket driven.
125 h.p., 16″ by 24″ steam engine.
6 h.p. F. & M. gasoline engine.
Worthington Steam pump 10″ intake, 8″ discharge, 20″ cylinders, shop number 16876.

E. W. COOPER
174 Third Ave., North Nashville, Tenn.

WANTED

2 end dump quarry cars, steel body 1½ yd. 36″.
1 No. 2 Gates Gyratory Crusher.

Give complete description in first letter, also location.

Wabash Stone Co., Geneva, Ind.

DRYERS

Having purchased 30 dryers 4′-0″ dia. x 30′-0″ long, with rollers, tires, gears, shafting, blowers, etc., we are prepared to offer them at a sacrifice before removal. Dryers are new and were never used. Furnace grates and doors or steam coils supplied. Write for price.

McDermott Bros. Co.
Allentown, Pa.

FOR RENT AND SALE

13—6-yd. re-built dump cars, std. gauge.
20—12-yd. Westerns, like new, std. gauge.
50—60,000-lb. capacity flat and box cars.
1—Western standard gauge spreader.
1—Osgood 18 revolving shovel, traction wheels, No. 794, ¾-yd. bucket, used 8 mos.
1—Marion 36 combination shovel and drag-line, No. 4725, caterpillar traction, 1½-yd. bucket; used 4 mos.; built March, 1921.
1—Marion 76 steam shovel, No. 3503, std. gauge.
1—Marion 76 steam shovel, No. 3503, std. gauge.

LOCOMOTIVES

2—32-ton Vulcan four-driver saddle-tank, used sixty days; built March, 1921.
1—40-ton 17x24 in. four-wheel switcher.
2—50-ton 18x24 in. six-wheel switchers.
2—NEW 25-ton six-wheel Porters, separate tenders, 36 in. gauge.
2—18, 14, and 10-ton Vulcans, 36 in. gauge.

Locomotive-Cranes, Railway Equipment, Etc.

INDUSTRIAL EQUIPMENT CO.
McCormick Building Chicago, Ill.

FOR SALE

Raymond Bros. Pulverizer No. 0, complete with dust collector, crusher and fan direct driven; used only two months; all parts in first class condition. For particulars address

BEAVER FALLS ART TILE CO.
Beaver Falls Pennsylvania

FOR SALE

1—8 Mold, Type No. 500 American Clay Machinery Company Rotary Brick Press.
1—9 foot American Clay Machinery Company's Wet Grinding Pan.

The above are in excellent condition, located near New York, and I will sell same at attractive figures. Address

Box 1511, Care of Rock Products
542 South Dearborn St. Chicago, Ill.

Used Equipment

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

FOR SALE

40" PULLEY.
40" face, 40" diameter. Straight face, double arm type. Brand new; never used. Bargain.

MADISON COAL CORPORATION
910 S. Michigan Ave. Chicago, Ill.

WANTED

One (1) 5x22 Allis-Chalmers Wet Grinding Tube Mill.

The Dolomite Products Company
1110 Euclid Ave. Cleveland, Ohio

New Rubber Belting

300 ft. 12" 6-ply	$0.99 per ft.
423 ft. 14" 5-ply	1.04 per ft.
527 ft. 14" 6-ply	1.25 per ft.
529 ft. 16" 6-ply	1.39 per ft.
520 ft. 16" 8-ply	1.90 per ft.
150 ft. 18" 6-ply	1.48 per ft.
512 ft. 18" 8-ply	2.00 per ft.

Rolls cut to any length.

The National Belting & Salvage Co.
268 East Water Street, Milwaukee, Wis.

We have for sale the following used machinery, in good condition, subject to prior sale, and cost of loading to be assumed by the purchaser.

1—No. 5 Champion Crusher	$ 500.00
1—No. 6 McCully, with extra head and shaft, two extra Master Wheels	3000.00
1—42" Trunion Chain Driven Revolving Screen, 18 ft. long	450.00
1—52" Trunion Chain Driven Revolving Screen, 18 ft. long	700.00
1—Thew No. 1 Steam Shovel, on Standard Railroad Gauge, having a one cubic yard dipper, Shop No. 835	3000.00
1—National, 3 Drum Hoist—10"x14" Cylinders, 30"x36" Drums	800.00
1—Bay City Clam Shell Bucket, No. 733	50.00
1—Upright Boiler Shell, 4'x11', 5-16" plate, lap seam, 2" Tubes (requires new tubes)	100.00
500 feet 2" Cable	250.00

E. J. LAVINO AND COMPANY
Attention Stone Dept.
559 Bullitt Building Philadelphia, Pa.

Classified Advertising

Rates for advertising in the Classified Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

OPPORTUNITY

to buy half-interest in well established limestone quarry located along main line railroad in Pennsylvania. Daily capacity 1000 tons. Modern crushing and lime plant. Anxious to develop pulverizing business. Here is a splendid opportunity for someone with cash. Address

Box 1512, Care of Rock Products
542 South Dearborn Street, Chicago, Ill.

WANTED

Superintendent for small lime manufacturing plant. Must be experienced and have thorough knowledge of quarrying and burning of lime. State experience, salary and references in first letter. Address

Box 1510, Care of Rock Products
542 South Dearborn St., Chicago, Illinois

WANTED

A position as manager or superintendent of lime plant. Am familiar with all methods of burning and hydrating, and can guarantee results as to economy and capacity. Having no encumbrance am willing to go any place. Can furnish good reference from last employer. Address

Box 1509, Care of Rock Products
542 S. Dearborn St. Chicago, Ill.

SUPERINTENDENT

desires engagement, crushing plant; over 20 years' experience in heavy rock excavation; crushing plants; thoroughly experienced; steam shovel operations; expert blasting; efficient transportation; agricultural limestone plants; and efficient handling of labor; excellent references. Address

Box 1513, Care of Rock Products
542 South Dearborn Street Chicago, Ill.

"DREDGING PUMP" FOR SALE

One 10" Morris Sand and Gravel dredging pump, 10" suction, 10" discharge, direct connected to double 9x9 engines.
One Scotch Marine Boiler, 200 H. P.

M. A. CALLAHAN
"The Sand Man"
Schofield Bldg. Cleveland, Ohio

We Design and Equip Complete Plants

for the manufacture of gypsum products, such as wall plaster, moulding plaster, wall board products, gypsum block products, also mixing plants.

We are prepared to furnish complete machinery-equipment and design and furnish plans for the installation. Consult our Engineering Department. Forty years' experience in designing of wall plaster machinery and plants.

The J. B. Ehrsam & Sons Mfg. Co.
Engineers, Machinists and Founders
Enterprise, Kansas

Service of Value

A plant manager told me he saved more than my fee, on one piece of equipment—

This constitutes a consulting service with a real money value behind it; a service that considers only the equipment best suited to the particular needs of the producer. There is no prejudice, no leaning toward one manufacturer.

Now is the time to make the necessary changes in your plant. Let us talk it over.

James N. Hatch, C. E., M. E.
Member A. S. C. E.
CONSULTING ENGINEER
736 1st Natl. Bank Bldg. Chicago, Ill.

Buyers' Bulletin

MANUFACTURERS OF MACHINERY AND EQUIPMENT:—These inquiries are live, up-to-date inquiries that have come direct to us from the individual in each case.

READERS OF "ROCK PRODUCTS":—This Department is for your special help and service. If you do not see what you require advertised in "Rock Products," tell us your needs and we will publish them here. There is no charge for this service.

Henry Rix, Milan Ind., wants catalogs and prices on cement block molds and concrete mixers.

J. E. Irvine, Green River, Wyo., advises that he wants prices and catalogs on crushers, sand screens, washers, separators, pumps and conveyors and that he expects to purchase this equipment by Jan. 1st.

N. Q. Speer, Berkeley Springs, W. Va., wants data regarding a revolving cylinder for reducing very soft, easily disintegrated sand rock to glass sand.

Danenhower & Hill Constr. Co., Box 336, Pascagoula, Miss., wants catalogs and prices on the following: cement brick machinery, conveying equipment, hand shovels, elevators and conveyors, dump wagons and dynamite.

Roscoe C. Clark, Kansas City, Mo., write us as follows: "I am seeking prices, specifications and details on cement mill equipment, suitable for an up-to-date modern cement plant; preferably 9-ft. kilns, not less than 8-ft; large size crushing and grinding machinery, motors, etc. Will you kindly put me in touch with sellers who have first-class equipment—not junk?"

Edwin M. Evans, Equip. Engineer, Virginia Highway Dept., Penitentiary Bldg., Richmond, Va., wants catalogs on the following: air compressors, conveyor belting, bins, blast hole drills, crushers, air drill hose, steam hose, screening equipment and wire rope.

Frank E. Gallup, 96 Schuyler St., Boonville, N. Y., wants data and catalogs on the following: boilers, conveyors, derricks, sand and stone dryers, 3-drum hoisting engines, hoists, screens, washing equipment and sand pumps.

The Westminster Sand & Gravel Co., Lima, Ohio, write as follows: "We are contemplating installing a concrete block plant and would like to get some information on that subject."

William Campion, New Toronto, Ont., Can., wishes to hear from firms supplying slate manufacturing machinery.

G. C. Buquo Lime Co., Hot Springs, N. Car., wants prices and data regarding forms for making concrete sewer pipe of the slip-joint type, also bell and spigot.

American Manganese Co., 77 E. Monroe St., Chicago, Ill., want prices and catalogs on the following: dragline excavators, steam shovels and dynamite.

B. F. Townsley, Jr., 19 Keele St., Toronto, Ont. Can., writes us as follows: "I am extending my activities to include quarry and gravel equipment and am quite interested in securing agencies for American firms who deal in this kind of machinery and would be very glad indeed to communicate with a view of representation with any firms who are desirous of having a representative in this Province.".

E. M. Confer, Mgr. Calera Development Co., Eureka, Shelby Co., Ala., wants to buy second-hand rock crushing plant machinery if in good condition; capacity 1000 tons of crushed stone daily.

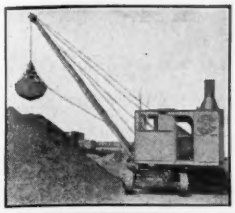
Allan & Evans, Port Arthur, Texas, are in the market for a 1-sack concrete mixer.

River Falls Power Co., River Falls, Ala., are in the market for a 3-4 or 1-yard concrete mixer.

Williamsport Sand & Gravel Sales Co., Ft. Locust St., Williamsport, Pa., are in the market for a second-hand Symons disc crusher 24-36".

Charles F. Fleming, Bowie, Md., advises that he is contemplating the development of a 106-acre sand and gravel tract, also the manufacture of concrete products and would like catalogs and prices on loaders, screening equipment and all necessary machinery for this plant.

BYERS *Model "10"*
Full Circle Crane



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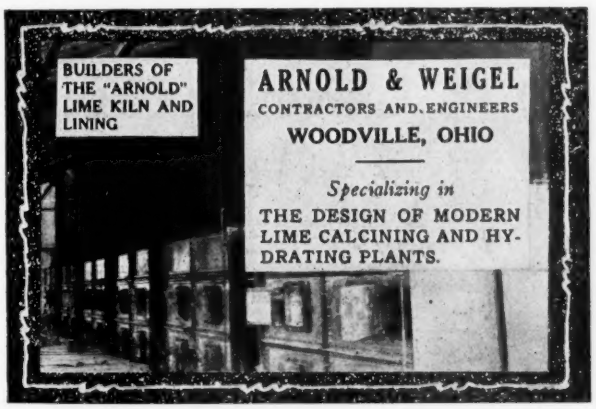
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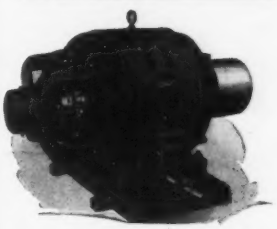

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We manufacture washing, crushing and drying machinery for phosphate and lime rock, suction and dipper dredges.

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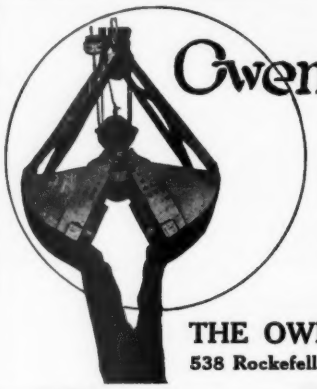

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dig, convey, elevate and dump in one operation

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Sauerman Bros.
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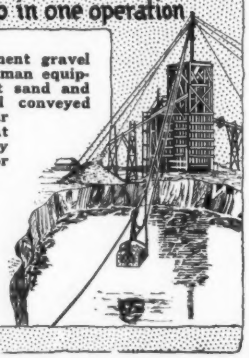

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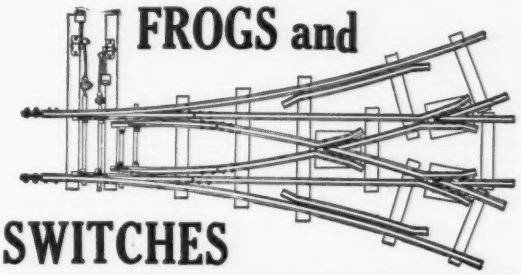

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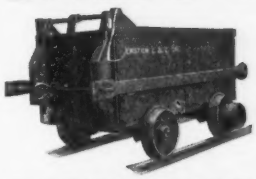

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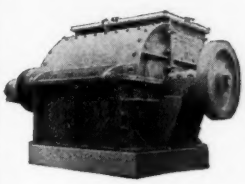

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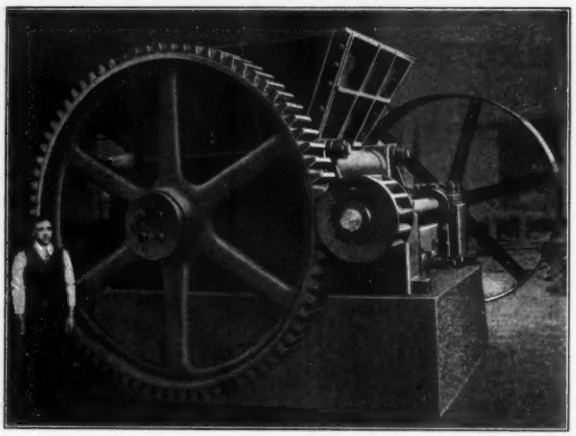

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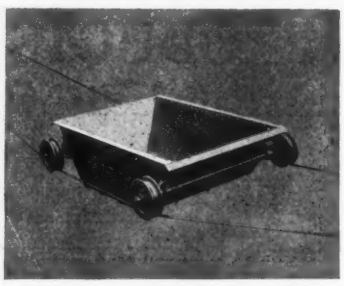

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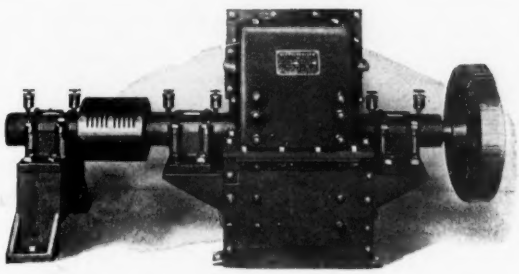

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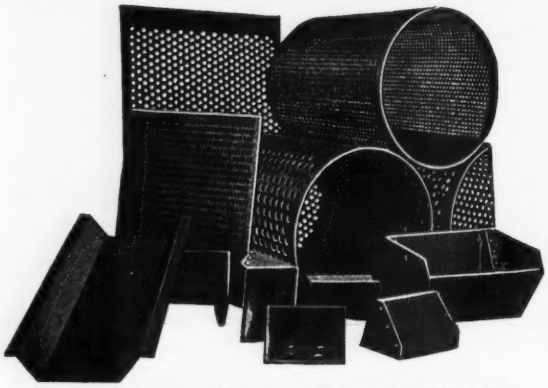

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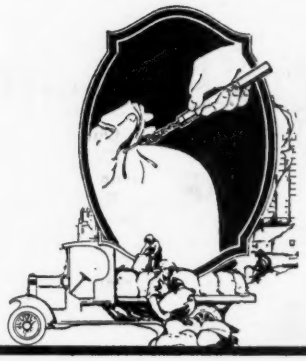

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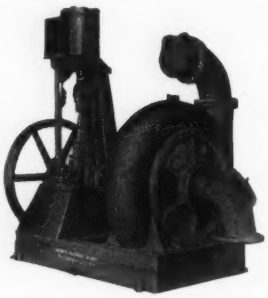

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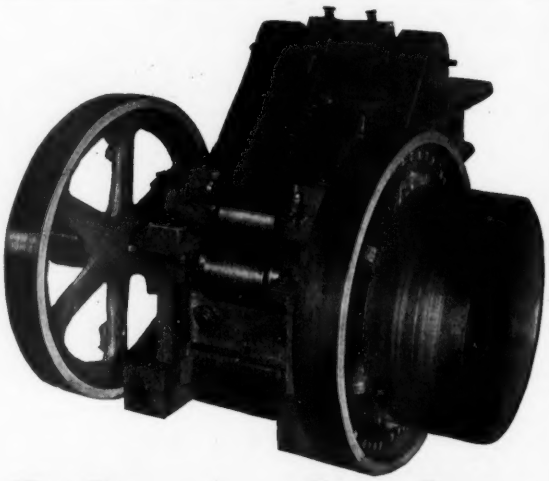

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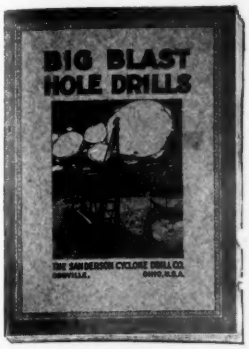

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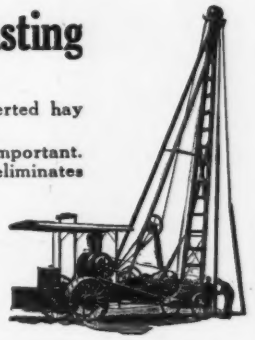

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Stucco Buildings, Concrete Blocks or Bricks faced with Metro-Nite are beautiful, artistic and everlasting.

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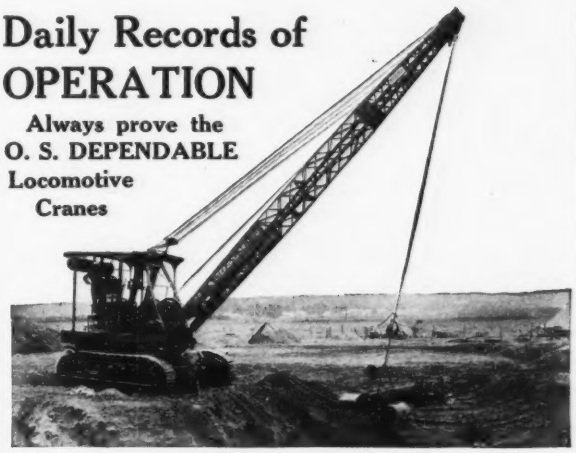

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Manufactured in capacities ranging from 7 to 60 tons. Write for catalogs No. 18-21

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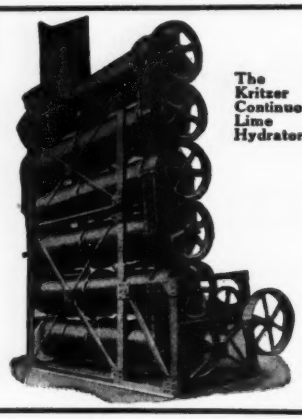

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THE KRITZER Continuous Lime Hydrator is efficient in production and economical in operation and maintenance. Let us investigate exhaustively the local conditions peculiar to your proposition, and then apply our experience of many years and design a plant to meet those conditions.

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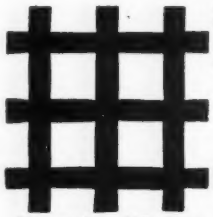
DES MOINES PRODUCTS include every type of structural steel construction and steel plate work.

REMEMBER: DES MOINES PRODUCTS are the result of 30 years' experience in designing, manufacturing and erecting, and have an established reputation for high QUALITY.

DES MOINES ENGINEERS can be consulted at any time without incurring obligation. Tell them your problems.

Pittsburgh-Des Moines Steel Co.
846 Curry Bldg., Pittsburgh, Pa.

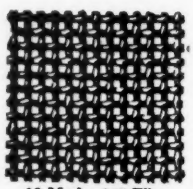
"CLEVELAND" DOUBLE CRIMPED WIRE CLOTH



2½ mesh; .105 wire

A uniform fineness is assured by the use of "Cleveland" Double Crimped Wire Cloth, making it unequalled for the screening of Sand, Gravel, Crushed Stone and Cement. "Service" is the definite policy of this organization, and through every phase of manufacture this end is constantly before us.

A large stock always on hand. However, any special mesh will be manufactured to suit requirements. PRICES RIGHT



1¾ Mesh; .047 Wire

THE CLEVELAND WIRE CLOTH AND MANUFACTURING COMPANY

3573 East 78th Street **Cleveland, Ohio**

Have you big rocks that are hard to handle?

If your rock blasts down in big chunks that are hard to load, you will be interested in the experience of George R. Dempster:

"We are handling rock that would scare a 95-ton steam shovel, and have loaded more than 10,000 cubic yards of rock per month with one ERIE, under adverse conditions. We consider the ERIE to be absolutely the best machine made for excavating purposes."—**George R. Dempster, Knoxville, Tenn., owner of 4 ERIE Shovels.**

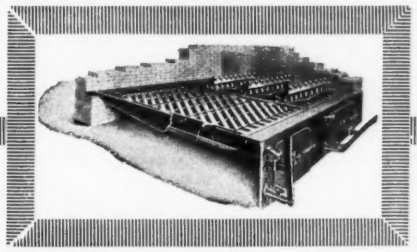
SERVES AS LOCOMOTIVE CRANE
Every ERIE Steam Shovel is quickly and easily convertible.

The ERIE has the strength for hard quarry service; you are sure of steady output, regardless of labor conditions.

You will find a complete and interesting description of the ERIE Shovel in our Bulletin P-16. Write for a copy.

BALL ENGINE CO., Erie, Pa., U. S. A.
Builders of ERIE Steam Shovels and Locomotive Cranes

ERIE Revolving Shovels BALL Engine Co. Erie, Pa.



Performance—

It is performance that has demonstrated the economical value and wonderful efficiency of

McGINTY GRATES

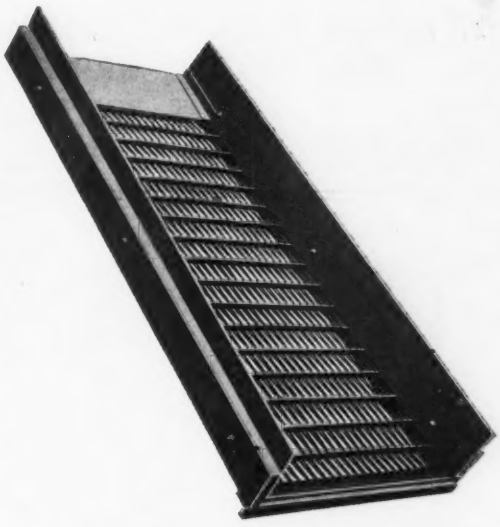
It is performance that has proven their ability to withstand a higher degree of heat without warping than any other grate on the market.

The greater air area of this grate permits a deeper bed of fuel.

It is a shaking, sifting and dumping grate and the fires can be cleaned with closed doors.

Send for descriptive matter and prices

The Kramer Bros. Foundry Co.
Dayton, Ohio



A radical departure in Screens

The Simplex Screen

Gravitation Principle—Wullstein Patents

No Cross Wires
No Openings with Closed Ends
Constantly Increasing Space Between All Teeth

Resulting in

AN ABSOLUTELY NON-CLOGGING SCREEN

No Power
No Labor
Huge Capacities
Efficient Screening
Long Life
Sectional Construction
Permitting Renewal of Desired Part Without Disturbing Other Parts

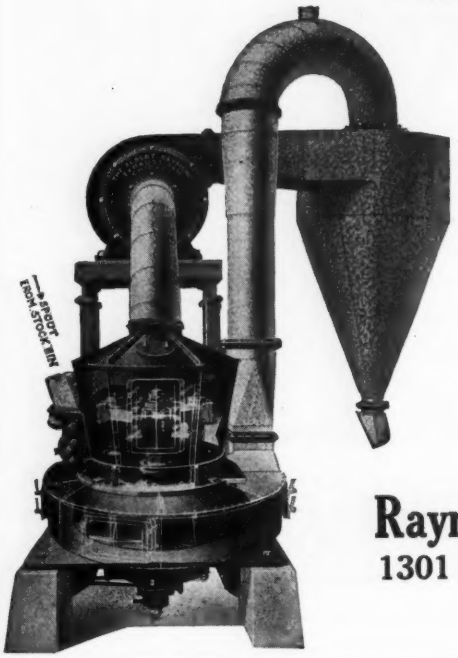
Simplex Screens now in successful operation handling many different materials.

Outline your requirements to us. Ask for Bulletin 10-B.

SIMPLEX SCREEN CO.

Felt Building **Salt Lake City, Utah**

EVEN ON YOUR 60 MESH MATERIAL RAYMOND ROLLER MILLS WILL DO THE GRINDING CHEAPER THAN ANY OTHER TYPE OF GRINDING MILL



At a recent installation Raymond Mills were adjusted for a fineness of 90% passing a 60 mesh test sieve when grinding Florida Pebble Rock. They gave 6.96 tons per hour with an expenditure of 90 HP.

Bearing in mind that these mills take the rock from storage and deliver finished material to storage, requiring no screens, makeshift air separators, or elevators, and are dustless in operation, we think a comparison of the results you get on your present equipment with those given above will show you the economy of using Raymond Mills the next time you are in the market for new equipment.

Raymond Bros. Impact Pulverizer Company
1301 North Branch Street **Chicago, Ill.**
Western Office: 201 Boston Bldg., Denver, Colo.
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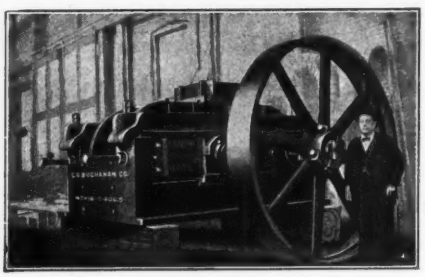
BUCHANAN CRUSHING ROLLS



Type "C" Buchanan Box Bed Crushing Rolls for Heavy Duty Bulletin No. 13

Years of manufacturing experience, combined with an intimate knowledge of the conditions under which such machines operate, assures the purchaser of Buchanan Equipment machines of remarkable durability.

COMPLETE CRUSHING PLANTS

C. G. BUCHANAN CO., Inc.
Cedar and West Streets NEW YORK CITY

Among the Precious Stones—

GREENSTONE

Is the one lasting ornament for surfacing Stucco. The natural olive-green color blends in harmony with Nature's color scheme, and age only tends to deepen the shade. The pure white back-ground of stucco, dashed with our No. 48 product, gives you a finish of unequalled beauty and durability.

Other Greenstone Products

Building Stone (Unfinished)
Commercial Stone
Greenstone Flour
Terrazzo Stone
Roofing Granules
Poultry Grit

Prices on Application

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When writing advertisers please mention ROCK PRODUCTS

Busy times are ahead for road builders and those who supply road-building materials

THE recommendation of Secretary of Commerce Herbert Hoover that the Governors of the several States should place contracts for as much of their road work as possible this fall instead of next spring, will undoubtedly stimulate greater activity in the rock products industry.

This industry felt a wonderful improvement during the recent summer months.

We are fully prepared to meet any demands upon us, either for the building of new power, or the manufacturing and forwarding of duplicate and repair parts for any bad-order locomotives.

Early Orders Will Guarantee Early Deliveries

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

The Wooden Barrel is Superior

THIS organization maintains for your convenience, forty-seven shops and warehouses in central and eastern states; and own or control the output of a large number of stave and heading mills located in the timber district of the Southwest. Therefore we are prepared to deliver the "Best Barrels Built," made of tongued and grooved staves, glued heading, thoroughly Kiln dried, and bound with wood, wire or steel hoops to meet your requirements.

These barrels are practically indestructible, rat, vermin and moisture proof, and meet all the government and railroad requirements for the safe transportation of poisonous substances.

If you are in a hurry, we can supply you.

SANDUSKY COOPERAGE & LUMBER CO., Toledo, Ohio

In Buying Blast Hole Drills

DON'T buy the kind of machine that others have used and discarded!

DON'T buy a machine that the greatest Quarry Engineers of the country have condemned after severe scientific tests.

BUT—buy the Drill that takes the first place under all conditions!

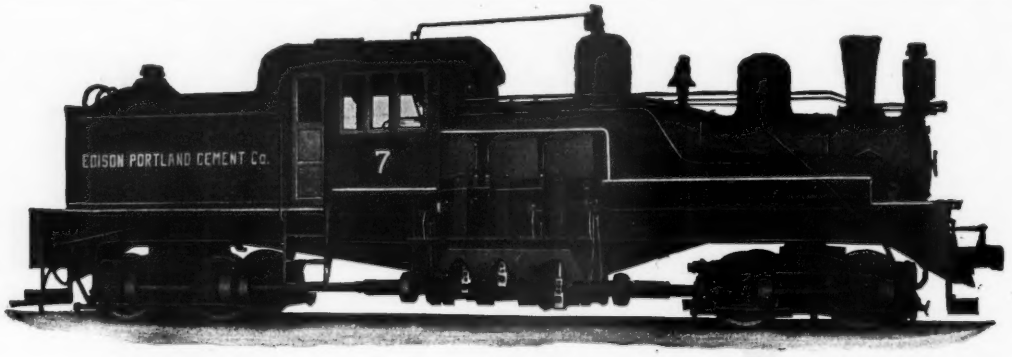
☛ **BUY the "CLIPPER"! The most satisfactory Blast Hole Drill in the world!**

Visit the "Big" Quarries in the eastern half of the United States and **see what they use!**

Then write to us or come and see us and get information that will put you on the right track. Many big quarries are saving thousands of dollars annually because they took and are taking our advice about Blast Hole Drilling matters!

☛ **If you make a mistake** you have **nobody to blame but yourself.**

The Loomis Machine Company, Tiffin, Ohio



Things to Consider

Economy of operation, performance and reputation of builder are important considerations in the selection of a locomotive for quarry and excavating work.

Lighter in weight than a rod engine and tender of equal power, Shay Geared Locomotives are more economical of fuel and supplies. Their simple, rugged construction insures continuous service with negligible upkeep attention.

Especially designed for use on rough track, grades and curves, the Shay moves materials rapidly, steadily, without derailment delays. The Shay starts quickly, accelerates rapidly and spots accurately.

Built in the Lima Works, the Shay carries the same assurance of quality and performance that accompanies the huge passenger and freight locomotives which Lima produces in great number for the railroads.

LIMA LOCOMOTIVE WORKS, Incorporated

LIMA, OHIO **17 East 42nd St., New York**

DORR

Cement Slurry

Better Mixed at Lower Prices

The manager of a large plant writes:

"We installed your Mixer in only one basin because it was new to us. We realize now, however, that we should be much better off as to both economy of operation and—what is even more important — a uniform cement mix, if we had your Mixers in all our basins."

The Dorr Slurry Mixer

At one plant, the Dorr Mixer has reduced a former average variation of 1% in the mix to 0.2%.

At another, two 18′ x 12′ mechanical agitators required a 20 H. P. motor. A Dorr Mixer of the same size used less than 4 H. P. for both power and air, and gave a far better mix.

At a third, the average time for obtaining a mix has been reduced 50%.

Write for Bulletin No. 22 and give us details of your conditions.

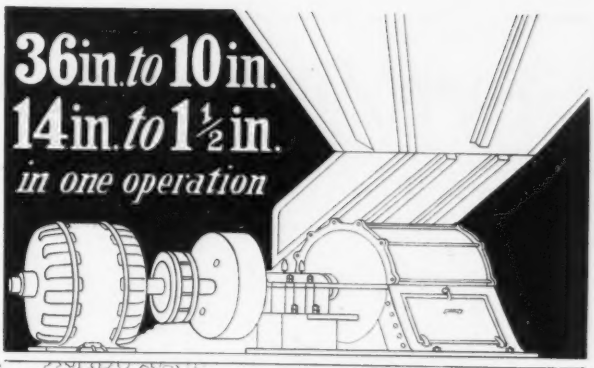
The Dorr Company

Engineers

101 Park Avenue

Denver **New York** **London, E. C.**

Research *Tests* *Design* *Equipment*



Williams Stone Crushers

"Mammoth" and "Jumbo" take the place of a whole battery of crushers.

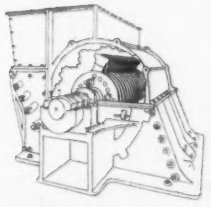
The Williams Mammoth Crusher takes limestone up to 36 inches and breaks it down to 10 inches and smaller. The "Jumbo" takes 14-inch stone and breaks it to 1½ inches and finer, in one operation. If used as a secondary crusher, the "Jumbo" takes stone as fast as the largest jaw crusher can deliver it, or from 50 to 200 tons per hour. It takes only about 1 h.p. per ton of rock crushed per hour, to operate the "Jumbo." With finer screens, the "Jumbo" will crush limestone for agricultural purposes.

Original Hammer Principle

The hinged hammer principle originated and perfected by Williams can be adapted to any conditions in your plant. The Williams Engineering Department makes no charge for complete analysis of your needs and for preliminary plans. Put your crushing problems up to us.

Used by Over Fifty Cement Companies

Over fifty prominent cement manufacturers are satisfied users of Williams Stone Crushers. The Monarch Cement Co., Humboldt, Kans., crush stone with a No. 6 Jumbo for 400,000 to 600,000 barrels of cement per year with practically no repair expenses in five years. They say: "It has been a source of pleasure to operate this crusher from every standpoint." The Southwestern Portland Cement Co., of El Paso, Tex., report that a Williams Jumbo cuts their horsepower requirements to 100 h.p. for 100 tons per hour.



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Williams Patent Crusher and Pulverizer Company

St. Louis, Missouri

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Williams

Patent Crushers – Grinders – Shredders

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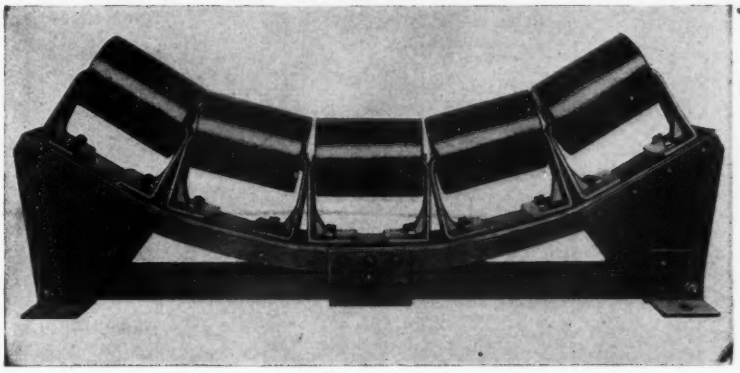
for extreme duty the Triple-X Carrier

Save:
Power
Belt Wear
Lubrication



S-A Unit Ball Bearing Carriers are Patented

RECOGNIZING the demand for a belt conveyor carrier of exceptional strength, S-A engineers developed the new Triple-X type. It is a carrier built entirely of steel and of massive construction, maintaining the same features and all the refinements of the popular S-A Unit Ball Bearing Conveyor Carrier.

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STEPHENS-ADAMSON MFG. CO., Aurora, Illinois

USE

Cordeau-Bickford Detonating Fuse

For well drill blasting and the tunnel and pocket method of blasting, where large quantities of explosive are to be detonated, use safe, efficient Cordeau-Bickford and get lower blasting costs.

The Ensign-Bickford Co., Simsbury, Conn.
Established 1836 **Original Makers of Safety Fuse**

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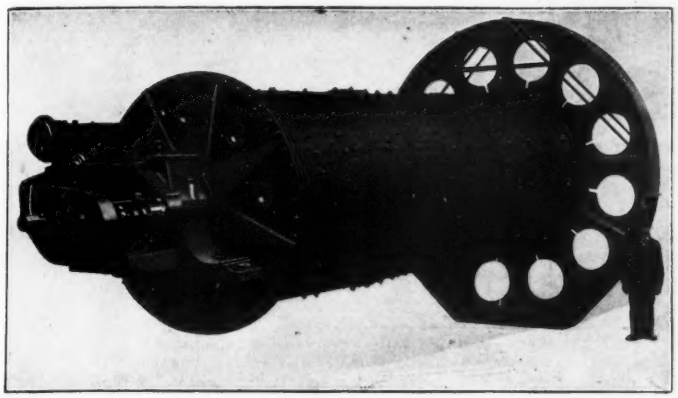

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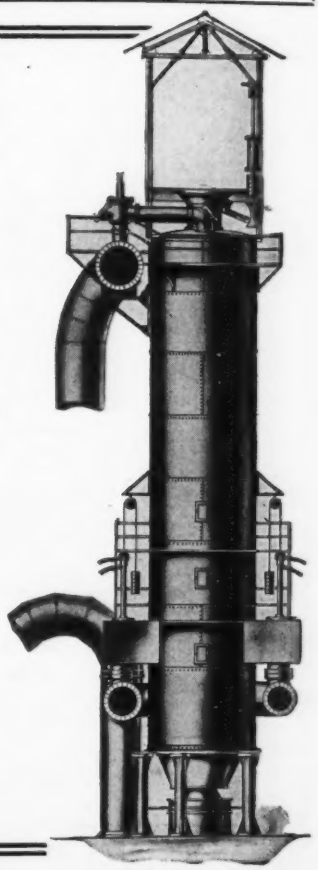

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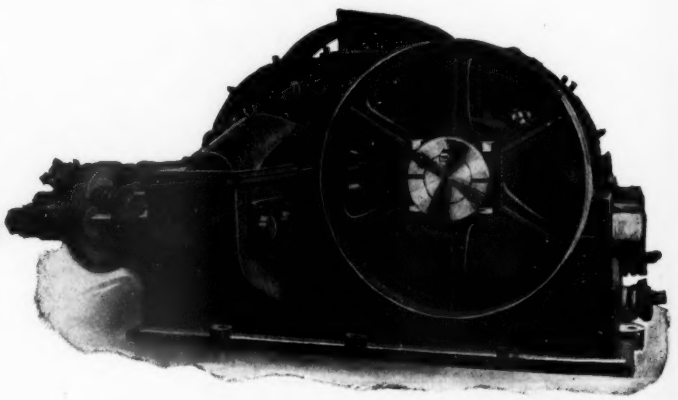

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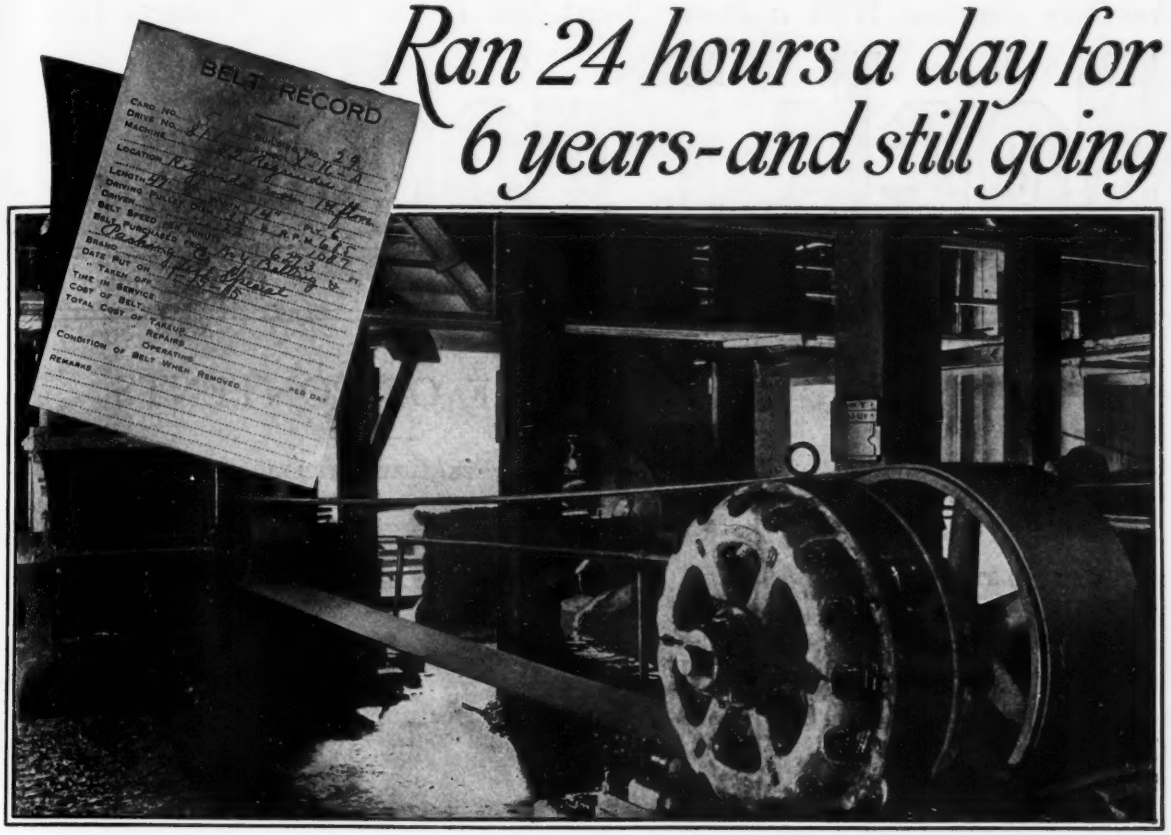

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